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cardiac arrhythmias:

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1. Systematic Reviews and Meta-Analysis

1.1. Generic acupuncture

1.1.1. Liang 2026

Liang Y, Zhou X, Shi X, Xie L. Acupuncture for cardiac arrhythmias: A systematic review and meta-analysis. *Medicine (Baltimore)*. 2026;105(25):e49187. <https://doi.org/10.1097/MD.00000000000049187>

Background	Arrhythmia is common, and some patients respond poorly or experience adverse reactions to standard cardioversion therapies, highlighting the need for safer adjunctive options. Although acupuncture has shown potential benefits, prior reviews have primarily focused on efficacy, and no systematic evaluation of its safety in arrhythmia has been conducted. To systematically assess the risk of adverse events (AEs) associated with acupuncture in patients with cardiac arrhythmias.
Methods	A systematic search of PubMed, Web of Science, EMBASE, China National Knowledge Infrastructure, Wanfang, and VIP Database for Chinese Technical Periodicals (VIP) databases was conducted from inception to November 2025 to identify randomized controlled trials (RCTs). The primary outcome was the incidence of AEs. Risk ratios with 95% confidence intervals were pooled using a random-effects model. Subgroup analyses were performed based on control type (pharmacotherapy vs sham acupuncture). The certainty of evidence was assessed using the Grading of Recommendations Assessment, Development and Evaluation approach.
Results	Five RCTs involving 356 participants were included. Overall, no statistically significant difference in AE risk was observed between acupuncture and control interventions (risk ratios $\approx$ 0.36, 95% confidence intervals: 0.07-2.01; $I^2 = 56.2\%$). Subgroup analyses suggested potential differences between control types; however, these findings are based on a small number of studies and should be interpreted with caution. In sham-controlled trials, AE incidence was low, although evidence was limited. No serious acupuncture-related AEs were reported. The certainty of evidence for AEs was rated as low.
Conclusion	Current evidence does not demonstrate a statistically significant difference in AE risk between acupuncture and control interventions. The overall certainty of the evidence is low, and findings should be interpreted with caution. Further high-quality RCTs are required to confirm the safety profile of acupuncture.

1.1.2. Liu 2024 (atrial fibrillation)

Liu Y, Pang X, Wang Y, Liu X, Jiang H. Evaluation of the efficacy and safety of acupuncture assisted

treatment for atrial fibrillation: A systematic review and meta-analysis based on randomized controlled trials. *Medicine (Baltimore)*. 2024 Nov 29;103(48):e40474.

<https://doi.org/10.1097/MD.00000000000040474>

Background	To systematically evaluate the efficacy and safety of acupuncture in the treatment of atrial fibrillation (AF).
Methods	Eight databases were searched. The search time limit is from January 2000 to November 2023. All randomized controlled trials on acupuncture treatment of AF were included. After the literature screening, data extraction and quality evaluation were carried out independently according to the inclusion and exclusion criteria, and the included literature was analyzed by Meta using RevMan 5.4 software.
Results	A total of 15 research studies on randomized controlled trials were included, involving 1960 patients . The results of the meta-analysis showed that acupuncture therapy could increase the sinus cardioversion rate of patients with AF, and the difference was statistically significant (relative risk = 1.21, 25% confidence interval (CI) [1.11, 1.31], $P < .001$). The clinically effective rate of the acupuncture plus drug treatment group was higher than that of the drug treatment group (relative risk = 1.32, 95% CI [1.19, 1.46], $P < .01$). Acupuncture plus other conventional therapies treatment was more helpful in reducing the ventricular rate of patients with AF (mean difference = -7.89, 95% CI [-14.52, -1.26], $P = .006$). The cardioversion time of patients with AF treated with acupuncture plus conventional therapies was shorter than those treated with traditional therapies alone (standardized mean difference = -1.82, 95% CI [-3.28, -0.35], $P = .01$). No severe adverse reactions such as hemorrhage, hematoma, or local infection caused by acupuncture were reported in the study.
Conclusion	The available evidence shows that acupuncture can effectively improve the total clinical effective rate and sinus rhythm recovery rate, shorten the recovery time of sinus rhythm, and reduce the ventricular rate, and there are no apparent adverse reactions. However, a limited number of studies may affect the generalizability of the findings. Future studies should include more extensive and diverse studies to enhance the power and generalizability of the findings.

1.1.3. Cai 2022 (premature ventricular complexes)

Cai Y, Zhang CS, Liu S, Zhou L, Tang B, Chen W. Acupuncture for premature ventricular complexes without ischemic or structural heart diseases: A systematic review and meta-analysis of clinical and pre-clinical evidence. *Front Med (Lausanne)*. 2022 Dec 8;9:1019051.

<https://doi.org/10.3389/fmed.2022.1019051>

Background	With increasing evidence suggesting potential benefits, acupuncture is often applied to the treatment of premature ventricular complexes (PVCs), particularly in symptomatic patients who fail or are unsuitable for medications or refuse catheter ablation. However, the existing clinical evidence is inconsistent.
Objectives	This review aims to systematically evaluate the effectiveness and safety of acupuncture therapies for PVCs without ischemic or structural heart diseases, when it is compared with sham/placebo acupuncture or usual care, or used as an add-on therapy to routine care; and to summarize existing pre-clinical research evidence supporting the effects of acupuncture therapies for this clinical condition.

Methods	Four English-language databases, four Chinese-language databases and seven clinical registries were searched from their inceptions to May 21, 2021 and updated to November 01, 2022. Trials comparing acupuncture with sham acupuncture or evaluating the add-on effects of acupuncture were included. Primary outcomes are the number of premature ventricular beats (PVBs) and effective rate defined as “the proportion of participants with over 50% decrease in the number of PVBs from baseline to the end of treatment measured by 24-h Holter”.
Results	A total of 479 records were identified with nine trials involving 847 participants included in this review. Meta-analysis on two sham-control trials with low risk of bias for all domains suggested that acupuncture could significantly reduce the number of PVBs (RR 3.83, 95% CI [2.19, 6.7], $I^2 = 0\%$). Moreover, the combination of acupuncture and standard treatment was superior to standard treatment alone in reducing the burden of PVBs (RR 1.21, 95% CI [1.08, 1.36], $I^2 = 0\%$). Though no treatment protocol consensus was announced, body acupuncture on point PC6, HT7, DU10, DU11, and ST36 with duration of needle retention ranging from 15 to 30 min for a 4-week treatment period is broadly used by the included trials. For experimental evidence, five studies explored the mechanisms of acupuncture for PVCs were eventually included into analysis and PC6 was the most frequently studied acupuncture point. Moreover, a reduction of electrical activity of sympathetic nerves in experimental animals undergoing electro-acupuncture was observed by four of these studies.
Conclusion	Sham-controlled RCT evidence with moderate-level certainty suggested that acupuncture could be a therapeutic option to reduce the burden of PVBs in patients without ischemic or structural heart diseases. Further clinical studies using validated and reliable outcome measurement instruments and bench research to unveil the mechanisms of acupuncture stimulation and point-specific effects for PVCs are needed.

1.1.4. Li 2022 (atrial fibrillation) ☆☆

Li Y, Song J, Wu B, Wang X, Han L, Han Z. Acupuncture versus pharmacological conversion in treatment of atrial fibrillation in a randomized controlled trial: a systemic review and meta-analysis. Eur J Med Res. 2022 Jul 4;27(1):110. <https://doi.org/10.1186/s40001-022-00738-4>

Objective	This study aimed to investigate the effect of conventional drugs combined with acupuncture therapy on the conversion of sinus rhythm in patients with atrial fibrillation.
Methods	We searched databases, such as PubMed, Embase, WOS, Cochrane, CNKI (China National Knowledge Infrastructure), Wan fang Data, VIP, and CBM to collect data in randomized controlled trials of acupuncture included patients with atrial fibrillation. Publication time was limited from the beginning to May 15, 2021. The primary outcome is the number of participants who converted successfully.
Results	A total of 11 papers were included in this study. The combined effect indicated that acupuncture significantly effectively benefitted the patients with atrial fibrillation (RR = 1.208, 95% CI 1.123, 1.298, $P < 0.001$). Further subgroup analysis of persistent and paroxysmal atrial fibrillation and the timing of acupuncture suggested that the addition of acupuncture was not statistically significant in the treatment of persistent AF compared to the control group (RR = 1.147, 95% CI 0.811, 1.623 $P = 0.147$). The combination of acupuncture was more effective in paroxysmal AF RR = 1.148 (95% CI 1.064, 1.239) $P < 0.001$. In addition, when the acupuncture time was limited to 20 min, it had the best treatment effect (RR = 1.510, 95% CI 1.25, 1.82).
Conclusions	The combination of pharmacological resuscitation with acupuncture significantly improved the conversion of paroxysmal atrial fibrillation compared to pharmacological resuscitation only. The most significant benefit was achieved with an acupuncture duration of < 20 min. Thus, the combination of acupuncture could be considered in clinical practice for the resuscitation of patients with atrial fibrillation.

1.1.5. Fei 2019 (Atrial Fibrillation) ☆☆

Fei Y, Fei R, Zhang J, Sun Y, Yu Q. Systematic Evaluation of Efficacy and Safety of Acupuncture Treatment for Patients with Atrial Fibrillation. Open Access Maced J Med Sci. 2019;7(3):461-466. [194679].

Background	Atrial fibrillation (AF) is one of the most common types of arrhythmia diagnosed in clinical practice. Due to its negative effects on people's physical and mental health, it is necessary to prevent and treat AF. Recently, scholars have found that acupuncture can be used to treat AF, but some scholars have questioned its therapeutic efficacy. AIM: Therefore, this study was performed to assess the efficacy and safety of acupuncture treatment for AF patients.
Methods	Previously published research articles were retrieved from six databases, and the data was analysed using RevMan5.3 software with a statistically significant difference defined as $P < 0.05$.
Results	A total of 8 relevant kinds of literature were retrieved containing 633 AF patients (323 in the treatment group and 310 in the control group). Acupuncture treatment increased the total efficacy and the rate of AF cardioversion to sinus rhythm (RR: 1.38; 95% CI: 1.25 to 1.53 vs RR: 1.40; 95% CI: 1.16 to 1.69; each $P < 0.05$), and decreased the time of AF cardioversion to sinus rhythm, the heart rate and incidence of adverse effects (RR: -3.95; 95% CI: -4.98 to -2.91 vs RR: -14.54; 95% CI: -24.09 to -5.00 vs RR: 0.48; 95% CI: 0.21 to 1.11, each $P < 0.05$). There was difference between retention time more and less than 30 minutes ($I^2 = 74.9\%$, $P = 0.05$). The funnel plot displayed a symmetrical and funnel-form shape, indicating low bias.
Conclusion	Acupuncture has a good therapeutic effect and safety profile on patients with AF, and its application in clinical practice should be considered.

1.1.6. Liu 2018

Liu Jing, Li Si-Nai, Liu Lu, Zhou Kun, 李彦, Cui Xiao-Yun, Wan Jie, Lu Jin-Jin, Huang Yan-Chao, Wang Xu-Sheng, Lin Qian. Conventional Acupuncture for Cardiac Arrhythmia: A Systematic Review of Randomized Controlled Trials. Chinese Journal of Integrative Medicine. 2018;24(3):218-226. [201781].

Objective	To exam the effect and safety of conventional acupuncture(CA) on cardiac arrhythmia.
Methods	Nine medical databases were searched until February 2016 for randomized controlled trials. Heterogeneity was measured by Cochran Q test. Meta-analysis was conducted if I^2 was less than 85% and the characteristics of included trials were similar.

Results	Nine qualified studies involving 638 patients were included. Only 1 study had definitely low risk of bias, while 7 trials were rated as unclear and 1 as high. Meta-analysis of CA alone did not have a significant benefit on response rate compared to amiodarone in patients with atrial fibrillation(Af) and atrial flutter(AF) [relative risk(RR):1.09;95% confidence interval(CI):0.79–1.49;P=0.61;I²=61%,P=0.11].However,1 study with higher methodological quality detected a lower recurrence rate of Af in CA alone as compared with sham acupuncture plus no treatment, and benefits on ventricular rate and time of conversion to normal sinus rhythm were found in CA alone group by 1 study, as well as the response rate in CA plus deslanoside group by another study. Meta-analysis of CA plus anti-arrhythmia drug(AAD) was associated with a significant benefit on the response rate when compared with AAD alone in ventricular premature beat(VPB) patients(RR,1.19,95% CI:1.05–1.34;P=0.005;I²=13%,P=0.32),and an improvement in quality-of-life score(QOLS) of VPB also showed in 1 individual study. Besides, a lower heart rate was detected in the CA alone group by 1 individual study when compared with no treatment in sinus tachycardia patients(MD -21.84 [-27.21,-16.47]) and lower adverse events of CA alone were reported than amiodarone.
Conclusions	CA may be a useful and safe alternative or additive approach to AADs for cardiac arrhythmia, especially in VPB and Af patients, which mainly based on a pooled estimate and result from 1 study with higher methodological quality. However, we could not reach a robust conclusion due to low quality of overall evidence.

1.1.7. Li 2017 ☆☆

Li Y, Barajas-Martinez H, Li B, Gao Y, Zhang Z, Shang H, Xing Y, Hu D. Comparative Effectiveness of Acupuncture and Antiarrhythmic Drugs for the Prevention of Cardiac Arrhythmias: A Systematic Review and Meta-analysis of Randomized Controlled Trials. *Front Physiol.* 2017. [195683].

Introduction and objectives	This study was designed to systematically evaluate the effectiveness of acupuncture treatment for arrhythmia compared to existing drug therapy.
Methods	Randomized controlled trials (RCTs) were identified through searches of the MEDLINE, CNKI, Embase, and Cochrane databases (1970 through 2016) and hand searches of cross-references from original articles and reviews. Clinical trials that randomized arrhythmia patients to acupuncture therapy vs. Conventional drugs, sham acupuncture, or bed rest were included for analysis.
Results	A total of 13 trials with 797 patients met the criteria for analysis. The results of the meta-analysis showed no statistically significant difference between acupuncture and conventional treatment for paroxysmal supraventricular tachycardia (PSVT) (n = 203; RR, 1.18; 95% CI 0.78-1.79; I ² = 80%; P = 0.44). However, in the ventricular premature beat (VPB) group, it showed a significant benefit of acupuncture plus oral administration of anti-arrhythmic drug (AAD) on response rates compared with the oral administration of AAD (n = 286; RR, 1.15; 95% CI 1.05-1.27; I ² = 0%; P = 0.002). Finally, when compared with the sinus tachycardia (ST) cases without any treatment, acupuncture has benefited these patients (n = 120; MD, 18.80, 95% CI 12.68-24.92; I ² = 81%; P < 0.00001).
Conclusions	In summary, our meta-analysis demonstrates that clinical efficacy of acupuncture is not less than AAD for PSVT. Furthermore, in sub-group analysis, acupuncture with or without AAD, shows a clear benefit in treating VPB and ST. However, more definitive RCTs are warranted to guide clinical practice.

1.1.8. Chung 2014 (heart rate variability) ☆

Chung JW, Yan VC, Zhang H. Effect of acupuncture on heart rate variability: a systematic review. *Evid*

Based Complement Alternat Med. 2014. [170065].

Aim	To summarize all relevant trials and critically evaluate the effect of acupuncture on heart rate variability (HRV).
Method	This was a systematic review with meta-analysis. Keyword search was conducted in 7 databases for randomized controlled trials (RCTs). Data extraction and risk of bias were done.
Results	Fourteen included studies showed a decreasing effect of acupuncture on low frequency (LF) and low frequency to high frequency ratio (LF/HF ratio) of HRV for nonhealthy subjects and on normalized low frequency (LF norm) for healthy subjects. The overall effect was in favour of the sham/control group for high frequency (HF) in nonhealthy subjects and for normalized high frequency (HF norm) in healthy subjects. Significant decreasing effect on HF and LF/HF ratio of HRV when acupuncture was performed on ST36 among healthy subjects and PC6 among both healthy and nonhealthy subjects, respectively.
Discussion	This study partially supports the possible effect of acupuncture in modulating the LF of HRV in both healthy and nonhealthy subjects, while previous review reported that acupuncture did not have any convincing effect on HRV in healthy subjects. More published work is needed in this area to determine if HRV can be an indicator of the therapeutic effect of acupuncture.

1.1.9. Wen 2014 (supraventricular tachycardia)

Wen Wx, Li Xs, Guo Xf, Zhou L, Lv Wh. [Effectiveness and safety of acupuncture for supraventricular tachycardia: a systematic review and meta-analysis]. Zhongguo Zhen Jiu. 2014;34(11):1146-50. [170457].

Objective	The effectiveness and safety of acupuncture for the treatment of supraventricular tachycardia were systematically reviewed.
Methods	The randomized controlled trials (RCTs) regarding acupuncture for supraventricular tachycardia were searched in domestic and overseas databases, and the evaluation tool of bias risk in Cochrane Handbook 5.1.0 software was used to perform the evaluation of bias risk in literature, and RevMan 5.2 software was applied for statistics and Meta-analysis.
Results	Five RCTs involving 323 patients were included. The results showed that compared with the blank control group, the acupuncture reduced the heart rate by 18.8 times/min [95% CI (12.68, 24.92)]; the clinical effective rate in the acupuncture group was superior to that in the diltiazem group [OR= 3.11, 95% CI (1.50, 6.46)]; the difference of immediate effect between propafenone and acupuncture was not significant. No reports regarding adverse events was described in 5 RCTs.
Conclusions	As was shown in the present evidence, acupuncture is safe and effective for the treatment of supraventricular tachycardia, but the level of evidence was low and the intensity of conclusion needed to be improved.

1.1.10. Kim 2011 (arrhythmias) Ø

Kim TH, Choi TY, Lee MS, Ernst E. Acupuncture treatment for cardiac arrhythmias: a systematic review of randomized controlled trials. Int J Cardiol. 2011;149(2):263-5. [156209].

In conclusion, the result of this systematic review does not provide conclusive evidence in support of acupuncture treatment for cardiac arrhythmias. RCT with methodological rigor should be promoted, along with the adoption of validated outcomes.

1.1.11. Lee 2010 (heart rate variability)

Lee S et al. Acupuncture and heart rate variability: A systematic review. *Auton Neurosci.* 2010;155(1-2):5-13. [155313].

Objectifs	Acupuncture has been reported to affect the autonomic system. Currently, there are no systematic reviews examining the effect of acupuncture on HRV available in the literature. Therefore, the aim of this systematic review was to summarize and critically assess the effects of acupuncture on heart rate variability.
Méthodes	We searched the literature using 14 databases for articles published from the earliest available publications until October 2009 without language restrictions. We included randomized clinical trials (RCTs) comparing acupuncture and sham acupuncture. The risk of bias in each study was assessed using the Cochrane criteria.
Résultats	Twelve RCTs met all of the inclusion criteria. One RCT evaluated the effects of acupuncture in patients with minor depression or anxiety disorders and another RCT examined the effect of acupuncture on migraine patients. Another four RCTs tested the effects of acupuncture in healthy subjects who were exposed to several conditions, including mental stress, fatigue from driving, and caffeine intake. The remaining six RCTs assessed the effects of acupuncture on healthy subjects in a normal state without any stressors. Five RCTs found significant differences in HRV between patients treated with acupuncture versus those treated with sham acupuncture (controls). However, the majority of the other RCTs showed inconsistent results or did not identify significant differences in HRV spectral parameters among individuals treated with acupuncture as compared to those treated with sham acupuncture.
Conclusions	In conclusion, sham-controlled RCTs showed variable results and no clear evidence that acupuncture has any specific effects on HRV. Therefore, more rigorous research appears to be warranted.

1.2. Special Acupuncture Techniques

1.2.1. Combined with oral Chinese medicine

1.2.1.1. Ning 2023

Ning S, Yan L, Li Y, Cui Z, Wang Y, Shi J, Zhao Y. Efficacy of acupuncture combined with oral Chinese medicine in the treatment of arrhythmia: A meta-analysis. *Medicine (Baltimore)*. 2023 Mar 24;102(12):e33174. <https://doi.org/10.1097/MD.00000000000033174>.

Background	At present, Western medicine treatment methods for arrhythmia emerge in an endless stream, but the accompanying side effects are also exposed, which brings pressure on medical resources and social economy. In recent years, the advantages of acupuncture combined with traditional Chinese medicine (TCM) in the control of arrhythmia have become increasingly prominent. Neiguan (PC6) is the collateral point in pericardium meridian; acupuncture at Neiguan can nourish the heart and calm the mind, and also plays an important role in treating arrhythmias. There is currently a lack of evidence-based medical evidence for the combination of acupuncture and TCM in the treatment of arrhythmia. This study aimed to investigate the effect of acupuncture combined with oral TCM in the treatment of arrhythmia.
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Methods	Randomized controlled trials published from the inception of databases to June 2022 were reviewed by searching the PubMed, Cochrane Library, Embase, CNKI, VIP, and WanFang databases. Review Manager 5.4.1 was used for the meta-analysis after the reviewers scanned the literature, extracted information, and identified the risk of bias.
Results	Eleven randomized controlled trials with 804 patients were reviewed, including 402 and 402 patients in the treatment and control groups, respectively. The results of the meta-analysis showed a significant benefit of acupuncture plus oral TCM in terms of clinical effectiveness compared with oral TCM alone ($n = 696$; relative risk (RR), 1.22; 95% confidence interval (CI) 1.14 to 1.30; $P < .00001$) and in lowering the number of premature beats in 24 hours ($n = 374$; standard mean difference, -10.55; 95% confidence interval (95% CI) -14.61 to -6.49; $P < .00001$). Acupuncture plus oral TCM was also found to improve the conversion rate ($n = 168$; RR, 1.32; 95% CI, 1.14-1.52; $P = .0002$) and increase the left ventricular ejection fraction ($n = 250$; mean difference, 6.57; 95% CI, 4.11-9.04; $P < .00001$), but it had no significant increase in adverse events ($n = 262$; RR, 0.57; 95% CI 0.30-1.09; $P = .09$).
Conclusion	Compared with oral TCM alone, acupuncture combined with oral TCM showed a clear benefit in treating arrhythmias and had no increase in adverse events.

1.2.2. Auricular acupuncture

1.2.2.1. Hua 2023 (heart rate and heart rate variability)

Hua K, Cummings M, Bernatik M, Brinkhaus B, Usichenko T, Dietzel J. Cardiovascular effects of auricular stimulation -a systematic review and meta-analysis of randomized controlled clinical trials. Front Neurosci. 2023 Sep 1;17:1227858. <https://doi.org/10.3389/fnins.2023.1227858>

Background	The number of randomized controlled trials using auricular stimulation (AS) such as transauricular vagus nerve stimulation, or other auricular electrostimulation or auricular acupuncture or acupressure, in experimental and clinical settings, has increased markedly over the last three decades. This systematic review focusses on cardiovascular effects of auricular stimulation.
Methods and analysis	The following databases were searched: MEDLINE (PubMed), EMBASE, Cochrane Central Register of Controlled Trials (CENTRAL), ISI Web of Science, and Scopus Database. RCTs were reviewed that had been published in English and European languages. Data collection and analysis was conducted by two reviewers independently. Quality and risk assessment of included studies was performed and the meta-analysis of the effect of the most frequently assessed biomarkers.
Results	Altogether, 78 trials were included. 38 studies assessed heart rate (HR), 19 studies analyzed heart rate variability (HRV) , 31 studies analyzed blood pressure (BP) and 7 studies were identified that measured oxygen saturation (O ₂), 2 studies on baroreflex sensitivity and 2 studies on skin conductance were evaluated in this review. 26 studies contained continuous data and were eligible for meta-analysis, 50 trials reported non continuous data and were evaluated descriptively. The overall quality of the studies was moderate to low. AS leads to a significant reduction of HR, the changes though were not considered an adverse reaction. Furthermore, when looking at HRV, AS was able to reduce the LF/HF ratio significantly compared to control procedures. No other cardiovascular parameters (blood pressure, oxygen saturation, baroreflex sensitivity) were changed significantly. AS produced only minor side effects in all trials.
Conclusion	AS can lead to clinically safe reduction of HR and changes in the LF/HF ratio of the HRV, which is presumably via an increase in vagal activity. More research is needed to clarify whether AS can be used to modulate tachycardia or indications with autonomic imbalance.

1.3. Mechanistic systematic reviews

1.3.1. Tu 2026

Tu D, Du X. Acupuncture and Metabolic-Mitochondrial Remodeling in Atrial Fibrillation: A Systematic Review and Research Recommendations. *Int J Gen Med.* 2026 Mar 14;19:579032. <https://doi.org/10.2147/IJGM.S579032>

Objective	To synthesize 2020-2025 evidence on whether acupuncture (including electroacupuncture) modulates metabolic remodeling and mitochondrial function in atrial fibrillation (AF), summarize putative mechanisms, and define research priorities.
Methods	PubMed, Web of Science, Embase, and CNKI were searched from January 2020 to October 2025 using controlled vocabulary and free-text terms, supplemented by backward citation tracking. Eligible publications in English or Chinese included original studies and reviews addressing AF metabolomics, mitochondrial biology, and acupuncture. Priority was given to direct AF evidence pairing an acupuncture intervention with metabolic or mitochondrial readouts. Mechanistically relevant indirect evidence was also incorporated from AF metabolic characterization studies and acupuncture-related metabolic research in other conditions. Findings were synthesized qualitatively without meta-analysis. The review was not preregistered and no formal risk-of-bias tool was applied; evidence types and uncertainty were described narratively.
Results	AF is consistently associated with metabolic reprogramming in serum and atrial tissue, involving energy pathways, lipid metabolism, and amino acid/one-carbon metabolism. Mitochondrial abnormalities-impaired biogenesis, altered dynamics, and oxidative stress-are frequently linked to electrophysiological remodeling and pro-fibrotic signaling. Preclinical and small-sample clinical studies suggest acupuncture can shift metabolic profiles and improve mitochondrial-related parameters, with emerging signals implicating vagal-immune-metabolic coupling in AF models. However, rigorous randomized trials in AF patients with longitudinal metabolomics and prespecified mitochondrial endpoints remain scarce.
Conclusion	Acupuncture may modulate AF-relevant metabolic and mitochondrial dysfunction through coordinated autonomic, inflammatory, and metabolic regulation. Future studies should adopt multi-timepoint multi-omics designs, STRICTA-compliant protocols, and integrated clinical-mechanistic pipelines to test causal links to electrophysiological outcomes.

2. Overviews of systematic reviews

2.1. Wang 2025

Wang C, Cao Y, Wang J, Chen J, Ma X, Wang X, Mao J. Efficacy and safety of acupuncture for arrhythmias: an overview of systematic reviews and meta-analyses. *J Tradit Chin Med.* 2025;45(6):1178-1190. <https://doi.org/10.19852/j.cnki.jtcm.2025.06.002>

Objective	To reevaluate systematic reviews and meta-analyses (SR/MAs) on the efficacy and safety of acupuncture in treating arrhythmias.
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Methods	SR/MAs of acupuncture for arrhythmias were retrieved from four English databases (PubMed, Embase, Web of Science, Cochrane Library) and four Chinese databases (China National Knowledge Infrastructure, China Science and Technology Journal Database, Wanfang Data, Chinese Biomedical Literature Database) up to December 2023. Data were extracted according to predefined criteria. Methodological quality was assessed using AMSTAR 2, reporting quality using PRISMA, and evidence quality using the GRADE approach.
Results	Ten SR/MAs were included, covering eight types of arrhythmias (atrial fibrillation, atrial flutter, paroxysmal supraventricular tachycardia, atrial premature beat, ventricular premature beat, sinus tachycardia, sinus bradycardia, and sick sinus syndrome) and ten outcome indicators. Acupuncture was associated with improvements in average heart rate and overall clinical efficacy, reductions in premature beats assessed by 24-hour dynamic electrocardiography, increased rates of sinus rhythm conversion in atrial fibrillation, and shorter time to conversion to sinus rhythm, without serious adverse reactions. Methodological quality was rated very low overall. Reporting quality showed five items as somewhat deficient and five as relatively complete. Evidence quality assessment yielded no high-quality outcomes, four of medium quality, thirteen of low quality, and seventeen of very low quality.
Conclusion	Acupuncture appears to be clinically effective as an adjunctive treatment for arrhythmias. However, the very low methodological and evidence quality of existing SR/MAs limits confidence in these findings, highlighting the need for higher-quality primary studies and rigorously conducted systematic reviews.

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