



Acupuncture as an adjunctive therapy for arrhythmia: a Delphi expert consensus survey

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Background: Current evidence suggests that acupuncture is an effective adjunctive therapy that can bring potential benefits to patients with cardiac arrhythmias. However, there are relevant gaps in the optimal therapeutic strategy, which may cause uncertainties on the best practice of acupuncture treatment for arrhythmia. We aim to develop consensus-based recommendations for clinical guidance on acupuncture treatment of cardiac arrhythmias.

Methods: A multidisciplinary panel of specialists was invited to participate in a two-round semi-open clinical issue investigation. Meanwhile, relevant literature reviews were searched in 3 databases to provide evidence. Subsequently, an initial consensus voting list on acupuncture as an adjunctive therapy for cardiac arrhythmias was derived from the clinical investigation and literature review. Finally, 30 authoritative experts reached a consensus on the key issues of the voting list by a three-round modified Delphi survey. Consensus was defined when >80% agreement was achieved.

Results: Following the three-round Delphi survey, there were 32 items (91.43%) finally reaching consensus, including the following 5 domains: (I) the benefits of acupuncture for the appropriate population; (II) the general therapeutic principle; (III) the acupuncture strategy; (IV) the relevant adverse events; (V) others.

Conclusions: Consensus was achieved on some key elements. Given the lack of guidelines and the substantial heterogeneity of previous studies, these recommendations are of value in providing guidance for clinical practice of acupuncturists and in assisting patients with arrhythmia to obtain standardized acupuncture treatment. It also pointed out some problems that need to be carefully explored in future studies.

Keywords: Acupuncture; cardiac arrhythmia; expert consensus; adjunctive therapy; Delphi study

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Introduction

Cardiac arrhythmia (CA) is a family of cardiac conditions characterized by irregular rate or rhythm of heartbeats (1). There are many types of CA with various manifestations

and hazards, such as sinus/atrial/ventricular arrhythmia, or tachyarrhythmia/bradyarrhythmia. The overall prevalence of CA is about 3.4% (2), and approximate 3.7 million people die of CA annually worldwide (3). There are many important factors that increase the risk of CA, such as

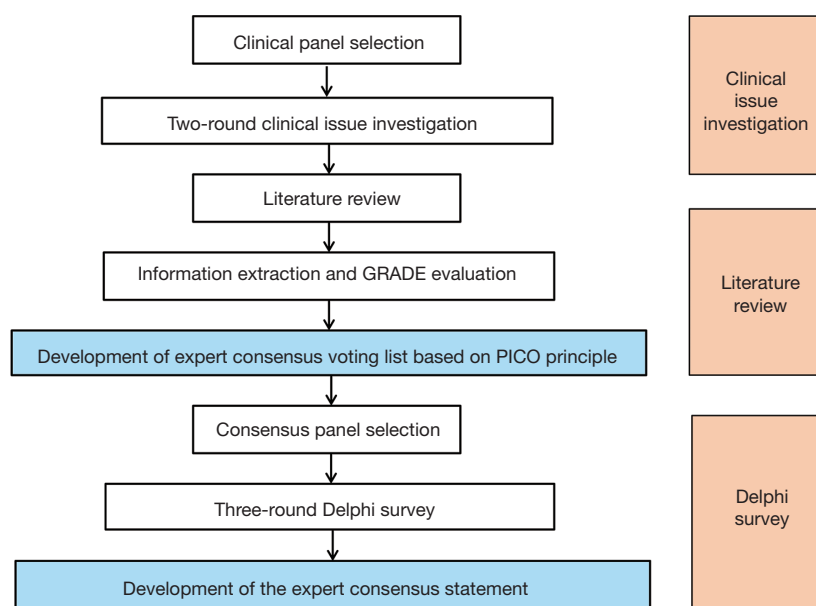


Figure 1 The development process of expert consensus. GRADE, Grading of Recommendations, Assessment, Development, and Evaluation; PICO, population, intervention, control, and outcomes.

aging, heredity, alcohol and tobacco use, physical inactivity, and obesity (4-10). In the context of an aging society, the increasing prevalence of CA is bringing a growing challenge to the global health-care system. It is urgent and of great significance to manage CA effectively, since CA is regarded as a leading cause of morbidity and mortality (11).

Conventional management depends on CA classifications, which mainly includes antiarrhythmic drugs, surgical treatment, catheter ablation, electrical cardioversion, and device implantation (12-14). However, to some extent, these therapies are plagued by insufficient effectiveness (15,16), limited indications, as well as conspicuous adverse effects and complications (17-19). The conventional management of CA brings health benefits to patients, but may be associated with a substantial financial burden (20). The limitations associated with conventional arrhythmia management have aroused interest in seeking an effective, inexpensive, and safe complementary intervention.

Acupuncture, as an ancient therapeutic method of traditional Chinese medicine (TCM), has a long-term practical history in treating palpitations (one of the main symptoms of arrhythmia). Currently, evidence has shown that acupuncture as an adjunctive therapy could produce benefits for patients with CA, especially in regulating the rate and rhythm of heartbeats (21-27). As a complex

intervention model, certain parameters of acupuncture (selection of acupoints, frequency of acupuncture, and duration of needle retention, etc.) are the important factors associated with the therapeutic effects (28). However, the acupuncture parameters applied in different clinical studies are distinct from each other, which may be a key reason for the inconsistent clinical effects. It is imperative to determine the optimal acupuncture parameters for CA treatment.

The uncertainties regarding acupuncture's therapeutic recommendations for CA has motivated extensive investigations on clinical issues of concern and prompted us to establish an expert consensus on this topic using a Delphi survey. The primary purpose was to optimize the acupuncture therapeutic strategy for better effectiveness and provide practical recommendations for future clinical practice and trials.

Methods

The development of the expert consensus consisted of the four major stages: (I) setting up an assistant team; (II) clinical issue investigation; (III) literature review; (IV) Delphi survey. The development of the expert consensus is shown in *Figure 1*.

Setting up an assistant team

An assistance team was responsible for the design, analysis, and interpretation of the questionnaires and voting lists. The assistance team consisted of one senior acupuncture expert (CZ Liu), two clinical acupuncturists (N Zhang, and JL Li), two methodologists (Wei Chen and LQ Wang) and two research secretaries (XT Su and Y Lin).

Clinical issue investigation

Development of the clinical questionnaire

After reviewing previous literature on acupuncture for CA, the assistance team came up with an initial clinical questionnaire by having several video conferences and group discussions. Subsequently, three acupuncturists (Hui Hu, Lin Du, and Y Lin) and two methodologists (Wei Chen and LQ Wang) were invited to revise the initial clinical questionnaire. According to their suggestions, the initial clinical questionnaire was modified by the assistance team. To gather a broader perspective on therapeutic suggestions, the modified clinical questionnaire was designed in a semi-open format.

Selection of the clinical panel

Given that acupuncture is related to empirical medicine, it is a critical step to collect pragmatic recommendations on clinical issues of concern to clinicians. Therefore, a group of acupuncturists from the China Association of Acupuncture-Moxibustion and cardiologists with clinical experience in the management of arrhythmia were convened to participate in the investigation of clinical issues. In addition, to further enrich the relevant questionnaires, they were also required to share relevant suggestions to facilitate the optimization of the later questionnaires.

Process of clinical issue investigation

The two-round clinical issue investigation was conducted from February 4, 2020 to March 24, 2020. The clinical questionnaire was sent to the clinical panel via online software (www.wjx.cn, a professional online questionnaire survey, evaluation, and voting platform). After analyzing the results of the first round, the assistant team formulated the second-round questionnaire based on the feedback from round 1 and sent it to the same panel again. By summarizing the results and the feedback of the two-round investigation, an initial expert consensus voting list was drafted in accordance with the population, intervention, control, and

outcomes (PICO) principle.

Literature review

To further supplement the expert consensus voting list, literature retrieval was conducted to provide evidence for the voting list. The systematic review on acupuncture treatment of CA was searched in PubMed, Embase and Cochrane Library databases from January 2000 to March 2020. Titles and abstracts were searched according to the following search terms: (acupuncture OR electroacupuncture OR electro-acupuncture) AND (arrhythmia OR arrhythmias OR cardiac arrhythmia OR cardiac arrhythmias OR Tachycardia OR bradycardia OR sick sinus syndrome OR premature beat OR sinus arrest OR conduction block OR atrial fibrillation OR atrial flutter OR ventricular flutter OR ventricular fibrillation OR Wolff-Parkinson-White syndrome) AND (review OR systematic review OR meta-analysis). Only systematic reviews restricted to English publications and full-text available were included. Two independent researchers extracted information and assessed the quality of clinical evidence under the guidance of the Grading of Recommendations, Assessment, Development, and Evaluation (GRADE). The quality of evidence was assessed as high certainty, moderate certainty, low certainty, very low certainty. The discrepancies between the two researchers were resolved by a third researcher. During the Delphi survey stage, the evidence from the reviews was appended to the corresponding items of the voting list for the panelists to make decisions.

Delphi survey

Selection of the consensus panel

Veteran acupuncture experts were convened to set up a consensus panel for a three-round Delphi survey. These experts had to be authoritative scholars with deputy senior titles or above, and have considerable experience in the acupuncture treatment of CA. The invitation letters were sent to these experts in advance via e-mail or WeChat (a universal Chinese instant messaging application) to ensure their willing in participating the survey. After confirmation of their attitudes, the Delphi surveys were conducted immediately.

Process of the Delphi survey

Delphi survey is an accepted scientific technique with a structured process (29,30). The consensus was conducted

on the basis of the modified Delphi method, using an approach similar to the frameworks for other consensus on non-pharmaceutical therapy (31-33). The expert consensus voting list, generated from the clinical issue investigation and the literature review, was sent to the consensus panel via online software (www.wjx.cn) from April 5 to 25, 2020. Panelists were instructed to record their responses as agreement, neutrality or disagreement for each item according to their experience and current evidence. Each item on the voting list was attached to a comment box to gather explanation and comment on the choice. The feedback from each round was fully utilized to optimize the items for the next round of Delphi survey. The consensus was defined when >80% agreement on a given item was reached (34). Otherwise, it was considered to be a controversial item. Based on the previous round of Delphi survey, the controversial items ($\leq 80\%$ agreement) would proceed to the next round of consensus voting. The expert consensus statements were achieved by the three rounds of the Delphi survey.

Formulation of the expert consensus statements

The assistant team drafted a manuscript on the expert consensus statements based on the three-round Delphi survey and relevant suggestions shared by panelists. Subsequently, the manuscript was sent back to the consensus panel for reconfirmation. After discussions and revisions, the final expert consensus statements were formulated.

Statistical analysis

The composition characteristics of the two panels (such as gender, years of clinical experience, professional title, geographical distribution, etc.) will be described as the percentage. For the results of the three-round of Delphi Survey, the proportion of “agreement”, “neutrality” and “disagreement” in each round was calculated respectively, and the consensus results were described as the percentage. The proportion was observed when more than 80%, so that the consensus could be reached on the “agreement”, “neutrality” and “disagreement”. The data was analyzed by SPSS software.

Results

Results of the two-round clinical issue investigation

A total of 70 individuals from different administrative regions of China were initially invited to participate in the clinical issue investigation. Fifty-nine clinical specialists (response rate: 84%) who expressed their willingness to participate the first round of investigation, and 53 of them completed the second round. More than half of these clinical specialists have more than 10 years of clinical experience. The detailed characteristics of the clinical panel are shown in *Table 1*.

After synthesizing the two-round clinical issue investigation, an initial expert consensus voting list with 35 items was generated and formulated in accordance with the PICO principle (as shown in *Table 2*). According to the feedbacks of the clinical specialists, the primary contents of the voting list included appropriate disease subtypes, acupuncture principles, acupuncture strategies, possible benefits, and adverse events.

Results of literature review

In the process of the literature review, only four systematic reviews were finally eligible according to our screening criteria (12,26,27,35). The quality of evidence from these systematic reviews were rated “very low” by GRADE standard. The key information of these systematic reviews was extracted and subsequently attached as evidence to the corresponding items on the initial expert consensus voting list. Items without available evidence were accompanied by the results of the two-round clinical issue investigation.

Results of the three-round Delphi survey

The Delphi survey was conducted in three rounds. A total of 30 panelists (response rate: 100%) completed the first round of Delphi survey, and 29 (96.67%) panelists accomplished the second round, and 30 (100%) panelists completed the third round of the survey. Nearly 90% of the panelists had senior titles and over 65% have at least 20-year acupuncture practical experience. The detailed characteristics of the consensus panel are shown in *Table 1*.

Table 1 Characteristics of the two panels

Variable	Expert				
	Clinical panel		Consensus panel		
	Round 1	Round 2	Round 1	Round 2	Round 3
Women, n (%)	35 (59.53)	33 (62.26)	11 (36.67)	10 (34.48)	11 (36.67)
Geographical distribution, n (%)					
Eastern China	18 (30.51)	18 (33.96)	8 (26.67)	8 (27.59)	8 (26.67)
Southern China	3 (5.08)	3 (5.66)	1 (3.33)	1 (3.45)	1 (3.33)
North China	18 (30.51)	16 (30.19)	11 (36.67)	11 (37.93)	11 (36.67)
Central China	3 (5.08)	3 (5.66)	4 (13.33)	4 (13.79)	4 (13.33)
Northeast China	11 (18.64)	9 (16.98)	3 (10.00)	2 (6.90)	3 (10.00)
Southwest China	4 (6.78)	2 (3.77)	3 (10.00)	3 (10.34)	3 (10.00)
Northwest China	2 (3.39)	2 (3.77)	0 (0.00)	0 (0.00)	0 (0.00)
Highest qualification, n (%)					
Bachelor's degree	3 (5.08)	3 (5.66)	2 (6.67)	2 (6.90)	2 (6.67)
Master's degree	17 (28.81)	15 (28.30)	7 (23.33)	7 (24.14)	7 (23.33)
PhD	39 (66.10)	35 (66.04)	21 (70.00)	20 (68.97)	21 (70.00)
Professional title, n (%)					
Intermediate title	14 (23.73)	12 (22.64)	0 (0.00)	0 (0.00)	0 (0.00)
Deputy senior title	25 (42.37)	21 (39.62)	3 (10.00)	3 (10.34)	3 (10.00)
Senior title	20 (33.90)	20 (37.74)	27 (90.00)	26 (89.66)	27 (90.00)
Acupuncture practical experience (years), n (%)					
3–10 years	18 (30.51)	15 (28.30)	1 (3.33)	1 (3.45)	1 (3.33)
11–20 years	31 (52.54)	28 (52.83)	9 (30.00)	9 (31.03)	9 (30.00)
21–30 years	8 (13.56)	8 (15.09)	8 (26.67)	8 (27.59)	8 (26.67)
>30 years	2 (3.39)	2 (3.77)	12 (40.00)	11 (37.93)	12 (40.00)

In the first round of voting, consensus (>80% agreement) was reached on 25 of 35 items presented on the voting list (*Figure 2*). Ten controversial items ($\leq 80\%$ agreement) were further assessed in round 2. And four items reached >80% agreement in the second round (*Figure 3*). The remaining six items were evaluated in the third round, and three items were achieved the consensus (*Figure 4*). On the basis of the panelists' feedbacks, no additional item was proposed to the list during the three-round survey. Totally, 32 items were compiled into the final expert consensus statements, and three controversial items were excluded after the three-round Delphi survey.

Formulation of the final expert consensus statements

The final expert consensus included 32 items that covered the topics of concern for the acupuncture treatment of arrhythmia. These items were classified into five domains: (I) the possible benefits of acupuncture on appropriate disease subtypes; (II) the general principle, such as syndrome differentiation and treatment; (III) the therapeutic strategy, mainly containing acupoints selection, frequency and duration, etc.; (IV) the common adverse events (e.g., subcutaneous hematoma); (V) others, such as the qualifications of acupuncturists.

Table 2 The expert consensus voting list

No.	Key items
1	Acupuncture is recommended as an adjunctive therapy for arrhythmias caused by cardiac diseases (coronary atherosclerotic heart disease, hypertension, cardiomyopathies, etc.)
2	Acupuncture is recommended as an adjunct therapy for arrhythmia caused by non-cardiogenic internal diseases (respiratory system diseases, and digestive diseases)
3	Acupuncture is recommended as an adjunct therapy for arrhythmia caused by lifestyle-related factors (over exercise, excessive emotion, drinking coffee, smoking and drinking, etc.)
4	For patients with sinus arrhythmia, acupuncture is recommended as an adjunctive therapy to relieve clinical symptoms (palpitations, dyspnea or shortness of breath, chest pain or discomfort, fatigue, and dizziness)
5	For patients with sinus arrhythmia, acupuncture is recommended as an adjunctive therapy to regulate the rate or rhythm of heartbeat (such as reducing frequency or duration of arrhythmia attacks, and decreasing the time of restoration to NSR)
6	For patients with sinus arrhythmia, acupuncture is recommended as an adjunctive therapy to improve the quality of life and mental conditions
7	For patients with atrial arrhythmia, acupuncture is recommended as an adjunctive therapy to relieve clinical symptoms (palpitations, dyspnea or shortness of breath, chest pain or discomfort, fatigue, and dizziness)
8	For patients with atrial arrhythmia, acupuncture is recommended as an adjunctive therapy to regulate the rate or rhythm of heartbeat (such as reducing frequency or duration of arrhythmia attacks, and decreasing the time of restoration to NSR)
9	For patients with atrial arrhythmia, acupuncture is recommended as an adjunctive therapy to improve the quality of life and mental conditions
10	For patients with tachyarrhythmia, acupuncture is recommended to as an adjunctive therapy relieve clinical symptoms (palpitations, dyspnea or shortness of breath, chest pain or discomfort, fatigue, and dizziness)
11	For patients with tachyarrhythmia, acupuncture is recommended to as an adjunctive therapy regulate the rate or rhythm of heartbeat (such as reducing frequency or duration of arrhythmia attacks, and decreasing the time of restoration to NSR)
12	For patients with tachyarrhythmia, acupuncture is recommended as an adjunctive therapy to improve the quality of life and mental conditions
13	For patients with bradyarrhythmia, acupuncture is recommended as an adjunctive therapy to relieve clinical symptoms (palpitations, dyspnea or shortness of breath, chest pain or discomfort, fatigue, and dizziness)
14	For patients with bradyarrhythmia, acupuncture is recommended as an adjunctive therapy to regulate the rate or rhythm of heartbeat (such as reducing frequency or duration of arrhythmia attacks, and decreasing the time of restoration to NSR)
15	For patients with bradyarrhythmia, acupuncture is recommended as an adjunctive therapy to improve the quality of life and mental conditions
16	For patients with atrial fibrillation, acupuncture is recommended as an adjunctive therapy to relieve clinical symptoms (palpitations, dyspnea or shortness of breath, chest pain or discomfort, fatigue, and dizziness)
17	For patients with atrial fibrillation, acupuncture is recommended as an adjunctive therapy to regulate the rate or rhythm of heartbeat (such as reducing frequency or duration of arrhythmia attacks, and decreasing the time of restoration to NSR)
18	For patients with atrial fibrillation, acupuncture is recommended as an adjunctive therapy to improve the quality of life and mental conditions
19	For patients who underwent invasive treatment (such as catheter ablation, pacemaker implantation) in arrhythmia, acupuncture is recommended as an adjunctive therapy to reduce the recurrence of arrhythmia
20	For patients who underwent invasive treatment (such as catheter ablation, pacemaker implantation) in arrhythmia, acupuncture is recommended as an adjunctive therapy to reduce the incidence of related cardiovascular events
21	For patients who underwent invasive treatment (such as catheter ablation, pacemaker implantation) in arrhythmia, acupuncture is recommended as an adjunctive therapy to improve the quality of life and mental conditions

Table 2 (continued)

Table 2 (continued)

No.	Key items
22	The relief of clinical symptoms can be maintained for 1-6 months after acupuncture treatment
23	The traditional Chinese medicine theory of syndrome differentiation and treatment is recommended to be carefully considered in the treatment of arrhythmia, especially for heart-yang stasis deficiency syndrome, qi-yin deficiency syndrome, qi stagnation and blood stasis syndrome, phlegm block syndrome etc.
24	It is recommended to select acupoints on <i>Shoujueyin</i> pericardial meridian and <i>Shoushaoyin</i> pericardial meridian.
25	The selection of acupoints is an important factor affecting the effectiveness of acupuncture. It is recommended to focus on the application of specific acupoints. The recommended specific acupoints are: <i>Neiguan</i> , <i>Xinshu</i> , <i>Danzhong</i> and <i>Shenmen</i>
26	The recommended types of specific acupoints are: <i>Beishu</i> acupoint and <i>Yuan</i> acupoint
27	The recommended specific acupoints combinations are: <i>Yuan-Luo</i> combination, and <i>Beishu-Mu</i> combination
28	The recommended acupuncture manipulation is the even reinforcing-reducing method
29	The recommended number of acupoints is 3-5 for each treatment
30	The commended duration of needle retention is 30 min for each treatment
31	The commended acupuncture frequency is 3 sessions per week
32	The recommend acupuncture course is 4 weeks
33	Deqi is an impartment factor for the achievement of therapeutic effect
34	Adverse events are uncommon in the acupuncture treatment of arrhythmia. Possible adverse events include subcutaneous hematoma and abnormal post-acupuncture sensation (such as pain, numbness)
35	It is recommended that acupuncture practitioners should hold the license of TCM and at least 3 years of experience in acupuncture

NSR, normal sinus rhythm; TCM, traditional Chinese medicine.

Discussion

This study aims to achieve an expert consensus on some specific issues of acupuncture treatment for arrhythmia by means of Delphi survey and resolved the most concerned issues of clinicians. In this consensus, experts agree that acupuncture can be a potential adjunctive therapy for arrhythmia. The results show high level of agreement amongst panelists for most items (32 of 35), especially in acupuncture parameters and influencing factors. A relatively optimized acupuncture strategy of arrhythmia has been formulated, which provides a certain reference for future clinical practice and trials. Considering the theoretical background of acupuncture, the consensus contains many items relates to the concept of TCM. Nevertheless, this consensus still has generalization and application.

According to our consensus, acupuncture was recommended as an adjunctive therapy to regulate the rate or rhythm of heartbeats for patients with arrhythmia. This is similar to the results of previous studies. Li *et al.* found that acupuncture plus oral antiarrhythmic drugs contributed

to a significant benefit on the rate or rhythm of heartbeat for patients with ventricular premature beats compared to oral antiarrhythmic drugs alone (12). Another meta-analysis showed that acupuncture combined with intravenous deslanoside had an additive effect on the response rate than intravenous deslanoside alone (35).

It is worth noting that experts agreed that acupuncture can improve the quality of life and clinical symptoms for all types of arrhythmias except atrial fibrillation in the first round, while it was not until the third round that consensus was agreed on improvement of rate and rhythm. This suggests that experts initially had doubts whether acupuncture could improve the objective arrhythmia parameters. Due to the low quality of current evidence, a robust conclusion cannot be drawn. Therefore, experts were more cautious when interpreted the results. In addition, acupuncturists know that acupuncture could improve the clinical symptoms such as palpitations and chest discomfort by communication with patients. However, due to the lack of relatively professional examinations (electrocardiogram, etc.) in the acupuncture clinics, experts are uncertain about

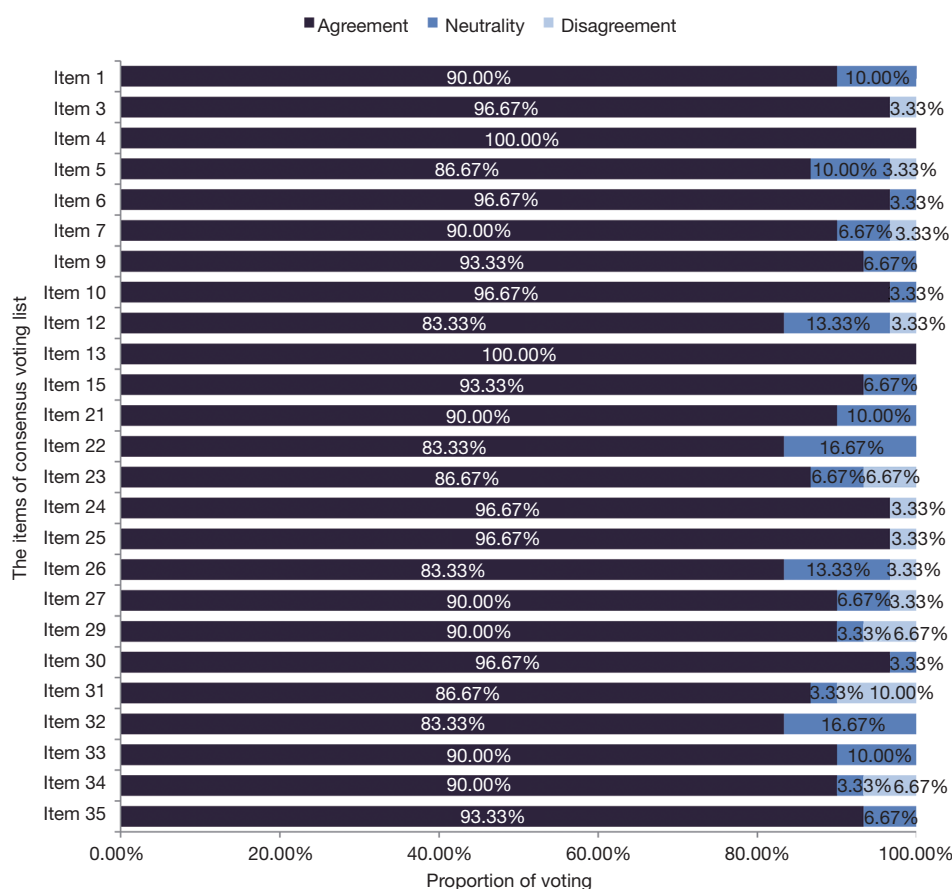


Figure 2 Results of the first round of Delphi survey.

whether acupuncture can influence the objective arrhythmia parameters. This may be the main reason for the hesitation of experts.

In view of the unique theory of TCM, experts emphasized that the principle of syndrome differentiation and treatment should be paid attention during the acupuncture treatment of arrhythmia, which is one of the basic principles of individualized treatment (36). On the other hand, the selection of acupoints is the crucial part of acupuncture treatment, especially the specific acupoints, which may directly affect the effectiveness (37-39). Based on the theory of acupuncture, specific acupoints are summarized with the specified label in the fourteen meridians according to their special therapeutic effects. Therefore, the assistant team specifically designed four items to discuss this issue. Experts highlight the application of specific acupoints and agree that specific acupoints should be given more priority during acupuncture treatment of arrhythmia. The recommended specific points include Neiguan, Xinshu, Danzhong and

Shenmen in this consensus. Consistent with the results of our consensus, a meta-analysis mentioned that 10 out of 13 studies mainly selected Neiguan, Xinshu and Shenmen for arrhythmia (12). In the management of CA, Neiguan is a commonly used specific acupoint. It has been demonstrated that electro-acupuncture on Neiguan point can lessen the myocardial injury by influencing Ca^{2+} key regulators (40), and protect the heart by regulating amino acid and energy metabolisms (41).

In addition to the acupoint selection, other acupuncture parameters (such as the number of acupoints, the frequency of acupuncture and the duration of needle retention) are of great concern to acupuncturists and can also affect the effectiveness. However, the appropriate parameters for these factors are often ignored and difficult to be verified in the randomized controlled trial. Delphi survey has a superiority that it can even be carried out securely while current evidence is insufficient in a certain field (42-44). We achieved consensuses on these parameters via Delphi survey.

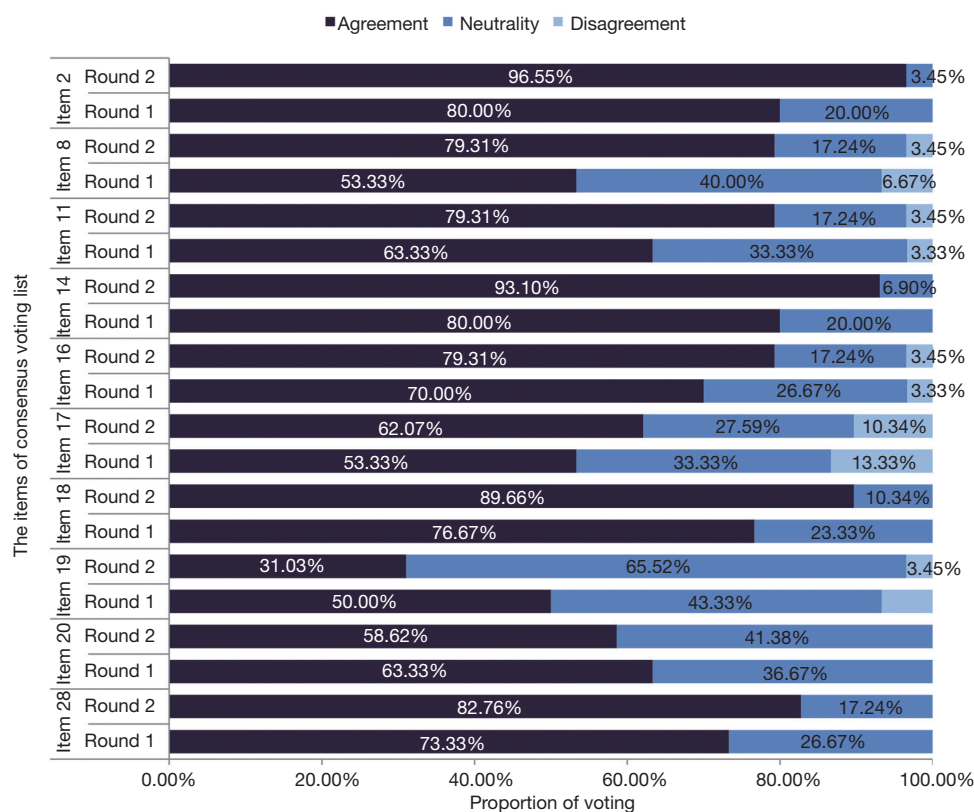


Figure 3 Results of the second round of Delphi survey.

More than 80% of the experts deem that it is reasonable to select 3–5 acupoints, retain 30 minutes, and 3 times a week. Since the Delphi survey can scientifically synthesize experts' opinions and deal with controversial clinical issues (45), our consensuses on these parameters are pragmatic for acupuncturists.

Arrhythmia is a kind of chronic disease that needs long-term management. In view of this, there is no wonder that safety should be one of the major concerns of patients and clinicians. Patients with arrhythmia are plagued by the increased risks of adverse effects from antiarrhythmic drugs, especially after long-term utilization. It should be noticed that one of the superiorities of acupuncture is safety. Ninety percent of experts agree that acupuncture has fewer adverse effects on the treatment of arrhythmia, which was similar to the previous studies (12,26,35). Therefore, acupuncture may be a safer option for patients with arrhythmia.

There were many controversies relating to the effectiveness of acupuncture in the treatment of patients with atrial fibrillation or underwent invasive interventions. One systematic review demonstrated that acupuncture

could bring benefits to patients with atrial fibrillation, such as increasing the rate of atrial fibrillation cardioversion to normal sinus rhythm (NSR), decreasing the time of atrial fibrillation cardioversion to NSR, reducing the heart rate (26). However, some experts retain a neutral or disagreed perspective on this aspect owing to the poor quality of studies and lack of clinical practice experience. Besides, fewer experts agree that acupuncture can reduce the recurrence rate or the incidence of relevant cardiovascular events after the invasive therapies. A major reason is the lack of available evidence on the effectiveness of acupuncture. Moreover, several experts honestly responded that they had limited experience of acupuncture in treating patients who underwent the invasive therapies. Since these patients generally had more serious conditions, cardiologists are their first choice, but not acupuncturists. Nevertheless, multidisciplinary treatment may provide more potentials for the management of arrhythmia, according to the remarkable efficacy of acupuncture in arrhythmia and the high agreement among panelists. Therefore, more high-quality clinical studies are urgently required to fill this gap

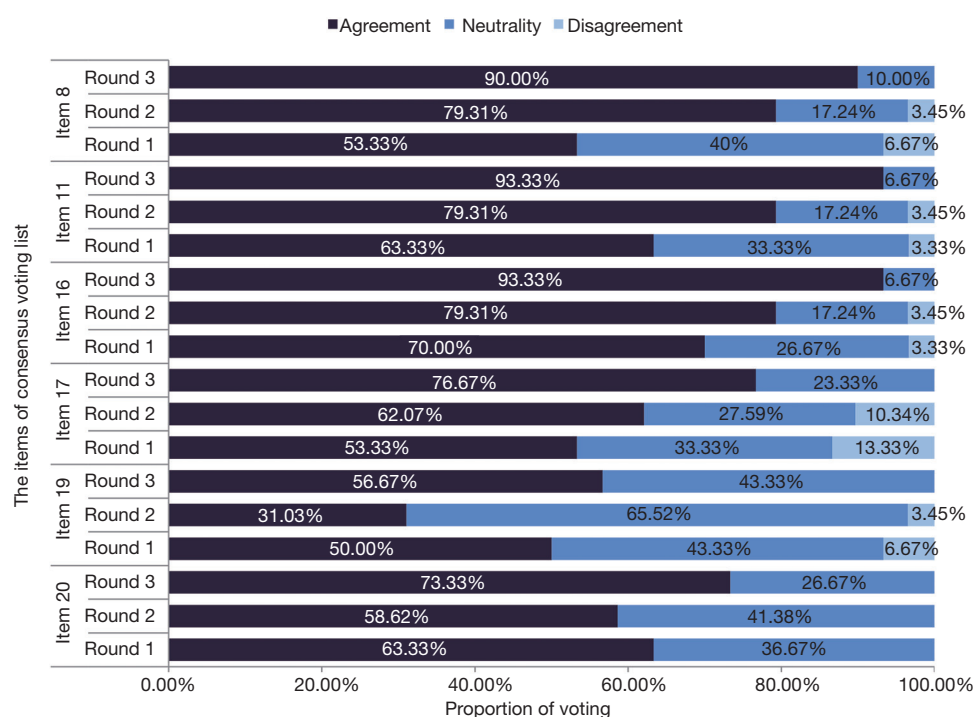


Figure 4 Results of the third round of Delphi survey.

and further verify the effectiveness of acupuncture.

This consensus provides a comprehensive comprehending for acupuncture in the treatment of arrhythmia by the integration of classical theories of TCM, clinical experience and literature review. Acupuncture is more inclined to empirical medicine, and the experience accumulated by acupuncturists plays an important role in the development of acupuncture. One of the highlights of this study is that the two-round clinical issue investigation was conducted prior to Delphi survey. The clinical issues, which attract the most attention, were specially collected from clinical specialists. During the clinical issue investigation, the feedbacks from clinical specialists were fully utilized in the development of the expert consensus voting list for Delphi survey. Furthermore, during the Delphi survey, another panel of experts were invited, who were more authoritative and experienced than the members in the clinical investigation stage. These experts were responsible for resolving controversial issues collected in the clinical investigation to provide guidance for clinical practice. These highlights will contribute to improve the practicality and accuracy of our consensus.

There are some limitations in this study. Despite both panels are carefully selected, these experts are all from

China, which limits the consensus extrapolation to other countries. Second, the available evidence cannot provide strong support for the consensus items due to the low-quality literature, which also promotes the development of our consensus. Third, it puts forward relevant suggestions on acupuncture strategies from a macroscopic perspective, and the therapeutic strategies for different subtypes of arrhythmias need to be further studied. Fourth, only veteran acupuncture experts were invited during Delphi survey, since this consensus aimed to formulate an optimal acupuncture strategy. However, experts in the field of arrhythmia should be invited in the future to improve the accuracy of the consensus.

Conclusions

In the case of insufficient evidence on clinical studies, the consensus generates an optimized acupuncture strategy, which provides a possibility to improve the management of arrhythmias. Our consensus propounds pragmatic recommendations and may be a useful tool for clinician decisions on the management of arrhythmia. Overall, acupuncture is one of the potential adjunctive therapies in arrhythmia and worth striving for.

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Footnote

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Ethical Statement: The authors are accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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