

INPLASY PROTOCOL

To cite: Yang et al. The outcomes of transcatheter adrenal ablation in patients with primary aldosteronism: a systematic review and meta-analysis. Inplasy protocol 2022110076. doi: 10.37766/inplasy2022.11.0076

Received: 16 November 2022

Published: 16 November 2022

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Support: None.

Review Stage at time of this submission: Completed but not published.

Conflicts of interest:
None declared.

The outcomes of transcatheter adrenal ablation in patients with primary aldosteronism: a systematic review and meta-analysis

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Review question / Objective: In the past two decades, transcatheter adrenal ablation and radiofrequency ablation have shown promising efficacy in the treatment of patients with APA. Transcatheter adrenal ablation is a interventional procedure which selectively injects ethanol into adrenal artery to ablate part of the adrenal gland. Recently, transcatheter adrenal ablation has been used as an alternative treatment for patients with unilateral PA without apparent adenoma as well as IHA. Although transcatheter adrenal ablation are claimed to be effective for treatment of PA, the evidence comes mostly from small sample size studies or case reports and the outcomes varies widely. In addition, transcatheter adrenal ablation as an alternative treatment for PA patients is still controversial. The aim of this meta-analysis is to evaluates the outcomes of adrenal ablation and estimate effectiveness and safety of this therapy.

INPLASY registration number: This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 16 November 2022 and was last updated on 16 November 2022 (registration number INPLASY2022110076).

INTRODUCTION

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adrenal artery to ablate part of the adrenal gland. Recently, transcatheter adrenal ablation has been used as an alternative treatment for patients with unilateral PA without apparent adenoma as well as IHA. Although transcatheter adrenal ablation are claimed to be effective for treatment of PA, the evidence comes mostly from small sample size studies or case reports and the

outcomes varies widely. In addition, transcatheter adrenal ablation as an alternative treatment for PA patients is still controversial. The aim of this meta-analysis is to evaluate the outcomes of adrenal ablation and estimate effectiveness and safety of this therapy.

Condition being studied: Primary aldosteronism (PA) is the most frequent form of endocrine hypertension, accounting for more than 10% of the general hypertensive patients and up to 20% of resistant hypertension patients. Studies have confirmed that excessive aldosterone can induce oxidative stress and inflammation, causing myocardial fibrosis and vascular remodeling. Patients with PA have higher risk of developing serious cardiovascular and renal complications compared with those with essential Hypertension. The most common subtypes of PA are Aldosterone-producing adenoma (APA), unilateral adrenal hyperplasia (UAH) and idiopathic hyperaldosteronism (IHA). Unilateral adrenalectomy is recommended for APA and UAH patients, because hypertension is improved in all and cured in 30%–60% of these patients. In bilateral IHA, unilateral or bilateral adrenalectomy seldom corrects the hypertension and medical therapy is the treatment of choice. However, some unilateral PA patients refuse adrenalectomy because of surgical risk. And there are also patients who are not candidates for surgery because of serious underlying medical conditions. Medical therapy is recommended for IHA patients, but some patients are intolerant to the adverse effects of mineralocorticoid receptor antagonists (MRA). So an alternative therapy is needed in such cases.

METHODS

Participant or population: 1) standard diagnostic and/or confirmation criteria was employed to diagnose and confirm primary aldosteronism. 2) All patients of study underwent adrenal venous blood sampling before ablation.

Intervention: Intervention: transcatheter adrenal ablation. Transcatheter adrenal ablation is a interventional procedure which selectively injects ethanol into adrenal artery to ablate part of the adrenal gland.

Comparator: No comparator.

Study designs to be included: The study design include non-randomized studies.

Eligibility criteria: 1) the study should provide the clinical success rate, or sufficient data for derivation of the clinical success rate. 2) the definitions of outcome should be clearly specified in the articles and the success of criteria include cure and significant remission. 3) each study should provide a clear follow-up period.

Information sources: A comprehensive search of Pubmed, Embase and Cochrane Library databases was carried out to identify studies published up to October 2022. The following keywords were used to identify potentially relevant studies from all databases: “Hyperaldosteronism OR Aldosteronism OR Primary Hyperaldosteronism OR Hyperaldosteronism, Primary” AND “Ablation Technique OR Embolization, Therapeutic OR Ablation OR Technique, Ablation OR Embolization OR Embolotherapy OR Therapeutic, Embolization”. The search was limited to studies published in English.

Main outcome(s): The main outcome is clinical success rate. The success include complete and partial success.

Additional outcome(s): biochemical success rate and complication (included fever rate, back pain rate and pleural effusion rate).

Quality assessment / Risk of bias analysis: The Methodological index for non-randomized studies (MINORS) tool was used to assess risk of bias. The ideal score being 16 for non-comparative studies and 24 for comparative studies. The bias risk was appraised by two independent

reviewers, and discrepancies were resolved in consensus between the two reviewers.

Strategy of data synthesis: All statistical calculations were performed using STATA, version 17.0 (STATA, College Station, TX). Statistical heterogeneity among studies was calculated using the I^2 statistic, $I^2 > 50\%$ is regarded as high-level heterogeneity. Given the high heterogeneity between studies, we used the DerSimonian and Laird method in generating the random effects models for the estimation of pooled rate. Publication bias could not be evaluated in ten or fewer studies as they lacked test power. P values of less than 0.05 were regarded as statistically significant.

Subgroup analysis: We performed subgroup analyses to explore the potential sources of heterogeneity, including PA subtype (only unilateral and unilateral+ bilateral) and outcome criteria (PASO and others).

Sensitivity analysis: None.

Country(ies) involved: China.

Keywords: primary aldosteronism, transcatheter adrenal ablation, clinical success, effectiveness, safety, meta-analysis.

Contributions of each author:

Author 1 - Yang Shunfan designed the study, collected, analyzed, and interpreted the data, and was the major contributor in writing the manuscript.

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Author 2 - Wang Guoliang participated in the collection of data and conceived the idea of the review.

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Author 3 - Li Nanfang conceived the idea of the review and revised article drafts and approved the final version.

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