INPLASY PROTOCOL

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Conflicts of interest:
None declared.

Laparoscopic adrenalectomy versus percutaneous ablation for aldosterone-producing adenoma: a meta-analysis

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Review question / Objective: **To compare the relative clinical efficacy and safety of laparoscopic adrenalectomy (LA) and percutaneous ablation for the treatment of aldosterone-producing adenoma (APA).**
Condition being studied: **Aldosterone-producing adenoma (APA) is a common adrenal benign tumor, which usually causes hypertension, hypokalemia, and metabolic alkalosis. Efforts to treat APA focus on normalizing blood pressure (BP), serum aldosterone, and potassium levels. Laparoscopic adrenalectomy (LA) results in a cure of hypertension in 21%–72% (mean 42%) of patients and improvement in 18%–68% (mean 43%) of patients with APA. Despite the benefits associated with its minimally invasive nature, LA is still limited by the need for general anesthesia, the risk of vascular or visceral injuries, and the demand for experienced surgeons. At present, computed tomography (CT)- or ultrasound-guided percutaneous ablation strategies have been used to treat a range of adrenal tumors. Compared with LA, percutaneous ablation is less invasive, more cost effective with comparable clinical success rate. Although several prior studies have compared the relative clinical efficacy of LA and percutaneous ablation for APA, all were retrospective analyses. The results from a single retrospective study might be influenced by many factors, a meta-analysis should be carried out to decrease the bias and increase the statistical power of the small sample study.**

INPLASY registration number: This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 02 April 2021 and was last updated on 02 April 2021 (registration number INPLASY202140006).

INTRODUCTION

Review question / Objective: **To compare the relative clinical efficacy and safety of laparoscopic adrenalectomy (LA) and percutaneous ablation for the treatment of aldosterone-producing adenoma (APA).**

Rationale: The immediate treatment success, improvement of serum potassium, operative time, postoperative hospital stay, complication rates, hypertension crisis rates, and post-operative medication use are used to assess the clinical effectiveness of the 2 methods.

Condition being studied: Aldosterone-producing adenoma (APA) is a common adrenal benign tumor, which usually causes hypertension, hypokalemia, and metabolic alkalosis. Efforts to treat APA focus on normalizing blood pressure (BP), serum aldosterone, and potassium levels. Laparoscopic adrenalectomy (LA) results in a cure of hypertension in 21%–72% (mean 42%) of patients and improvement in 18%–68% (mean 43%) of patients with APA. Despite the benefits associated with its minimally invasive nature, LA is still limited by the need for general anesthesia, the risk of vascular or visceral injuries, and the demand for experienced surgeons. At present, computed tomography (CT)- or ultrasound-guided percutaneous ablation strategies have been used to treat a range of adrenal tumors. Compared with LA, percutaneous ablation is less invasive, more cost effective with comparable clinical success rate. Although several prior studies have compared the relative clinical efficacy of LA and percutaneous ablation for APA, all were retrospective analyses. The results from a single retrospective study might be influenced by many factors, a meta-analysis should be carried out to decrease the bias and increase the statistical power of the small sample study.

METHODS

Search strategy: (((ablation [Title/Abstract]) AND (((Adrenalectomy [Title/Abstract]) OR (surgery [Title/Abstract])) OR (resection [Title/Abstract])))) AND ((adrenal benign tumor [Title/Abstract]) OR (Adenoma [Title/Abstract])))) AND ((((computed tomography [Title/Abstract]) OR (CT [Title/Abstract])) OR (ultrasound [Title/Abstract])) OR (imaging [Title/Abstract])).

Participant or population: Patients with APA.

Intervention: Laparoscopic adrenalectomy.

Comparator: Ablation.

Study designs to be included: Studies eligible for inclusion were: Study design: randomized controlled trials (RCTs) or retrospective comparative studies; Patients: patients with functional APA; Treatments: LA versus imaging-guided percutaneous ablation; Languages: Not limited. Studies that were (a) single-arm studies, (b) non-human studies, or (c) review articles were excluded.

Eligibility criteria: Studies eligible for inclusion were: Study design: randomized controlled trials (RCTs) or retrospective comparative studies; Patients: patients with functional APA; Treatments: LA versus imaging-guided percutaneous ablation; Languages: Not limited.

Information sources: The Pubmed, Embase, Cochrane Library, Wanfang, VIP, and CINK databases were searched for relevant articles published as of March 2021.

Main outcome(s): Immediate treatment success, improvement of serum potassium, operative time, postoperative hospital stay, complication rates, hypertension crisis rates, and post-operative medication use.

Additional outcome(s): None.

Data management: All analyses are conducted using RevMan v5.3. The Mantel-Haenszel method is used to measure pooled odds ratios (ORs) and 95% confidence intervals (CIs) for dichotomous variables, while mean difference (MD) values and 95% CIs are used when analyzing continuous variables. Pooled survival rates are assessed based upon hazard ratios (HRs) and 95% CIs. The X2 and I2 tests are employed to assess study heterogeneity, with an I2 > 50% being consistent with significant heterogeneity. Fixed-effects models are used to analyze

data affected by significant heterogeneity, while a random-effects model is otherwise used. Sensitivity analysis is used to identify sources of heterogeneity, while the risk of bias is gauged using funnel plots.

Quality assessment / Risk of bias analysis: The 9-point Newcastle-Ottawa scale was used to assess all non-RCTs [18], with a score of ≥ 6 points being indicative of high quality.

Strategy of data synthesis: All analyses are conducted using RevMan v5.3. The Mantel-Haenszel method is used to measure pooled odds ratios (ORs) and 95% confidence intervals (CIs) for dichotomous variables, while mean difference (MD) values and 95% CIs are used when analyzing continuous variables. Pooled survival rates are assessed based upon hazard ratios (HRs) and 95% CIs. The X2 and I2 tests are employed to assess study heterogeneity, with an I2 > 50% being consistent with significant heterogeneity. Fixed-effects models are used to analyze data affected by significant heterogeneity, while a random-effects model is otherwise used. Sensitivity analysis is used to identify sources of heterogeneity, while the risk of bias is gauged using funnel plots.

Subgroup analysis: None.

Sensitivity analysis: None.

Language: English.

Country(ies) involved: China.

Other relevant information: None.

Keywords: Laparoscopic adrenalectomy; Ablation; Aldosterone-producing adenoma; Meta-analysis.

Dissemination plans: We plan to publish a meta-analysis.

Contributions of each author:
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