

INPLASY PROTOCOL

To cite: Wang et al. Systematic review and meta-analysis for retrograde Percutaneous nephrolithotomy. Inplasy protocol 202290029. doi: 10.37766/inplasy2022.9.0029

Received: 07 September 2022

Published: 07 September 2022

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Support: None.

Review Stage at time of this submission: Preliminary searches.

Conflicts of interest:
None declared.

Systematic review and meta-analysis for retrograde Percutaneous nephrolithotomy

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Review question / Objective: This systemic review and meta-analysis will search and collect relevant literatures on retrograde pathway establishment of PCN channel, use meta-analysis to increase the test power and accuracy of effect size, objectively evaluate the current available results from a methodological point of view, in order to find reliable evidence on the efficacy and safety of retrograde PCN channel establishment for percutaneous nephrolithotomy.

Condition being studied: Renal calculus is a common disease in human urinary system, and percutaneous nephrolithotomy (PCNL) is one of the most popular surgical method in the treatment of renal calculus. The key step during PCNL is the creation of access (or channel) from skin into the renal collecting system in an antigrade way. This is not only a key step but also a challenge to the urologist. The learning curve is long and steep. In recent years, with application of flexible ureteroscope, retrograde PCNL, during which a retrograde access form the fornix of renal calyces under the supervision of the flexible ureteroscope is conducted accurately. However, this method is still not accepted widely in clinical practice.

INPLASY registration number: This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 07 September 2022 and was last updated on 07 September 2022 (registration number INPLASY202290029).

INTRODUCTION

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use meta-analysis to increase the test power and accuracy of effect size, objectively evaluate the current available results from a methodological point of view, in order to find reliable evidence on the efficacy and safety of retrograde PCN

channel establishment for percutaneous nephrolithotomy.

Rationale: At present, most of the PCNL access is conducted under the guidance of X-rays or ultrasonography in an antigrade pathway. However, antigrade access needs accurate puncture to the fornices of renal calyces, which is often a challenge to most of the urologists. The method of retrograde access for percutaneous nephrolithotomy has been reported several decades. In recent years, with the popular application of flexible ureteroscope, it has been reported that direct intra-renal puncture of the fornix of renal calyces under the supervision of the flexible ureteroscope is a safe and simple method for the conduction of access in PCNL. Unfortunately, there is still little application of this method in the clinical practice. So, we want to do a systemic review and meta-analysis in this field, reationale some of the potential reasons behind them, and if possible, recall clinical interests in the application of this retrograde access for percutaneous nephrolithotomy.

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METHODS

Search strategy: Source: Pubmed, EMBase, Web of Science, CNKI (Chinese knowledge information)
Search number Query
1 urolithiasis[MeSH Terms]

2 nephrostomy, percutaneous[MeSH Terms]
3 nephrolithotomy, percutaneous[MeSH Terms]
4 (renal calculi[MeSH Terms]) OR (renal calculus[MeSH Terms])
5 (retrograde[Title/Abstract]) OR (retrogradely[Title/Abstract])
6 (((access[Title/Abstract]) OR (tract[Title/Abstract])) OR (creation[Title/Abstract])) OR (puncture[Title/Abstract])
7 #1 and #5 and #6
8 #2 and #5 and #6
9 #3 and #5 and #6
10 #4 and #5 and #6.

Participant or population: Two participants: Retrograde PCNL and Antigrade PCNL . 4

Intervention: PCN access conducted antigradely vs PCN access conducted retrogradely.

Comparator: Time for creation of PCN access, blood loss, operation time, stone clearance rate, and peri-operation complications between the two groups will be compared with each other. Establishment of PCN channel by simple retrograde approach in the treatment of renal calculi.

Study designs to be included: All the report, randomized or non-randomized study will be included. retrospective study.

Eligibility criteria: Retrograde PCNL and Antigrade PCNL for the first time in the treatment of renal or upper ureter calculi will be all included. Inclusion criteria were: (1) renal calculi, upper ureteral calculi; (2) assignment to retrograde PCNL or (3) to antigrade PCNL; (4) the study was published in a peer-reviewed journal. Exclusion criteria was: the study provides insufficient data for the calculation of an effect size (unless authors were able to provide these data).

Information sources: Pubmed, Embase, web of science, Cnki, Wanfang Database, VIP, CBMDISC.

Main outcome(s): In about 1 year, after analysis, evaluations about the retrograde PCNL, especially the feasibility, security will be presented.

Additional outcome(s): Comparability to the retragrade PCNL, inferiority, non-inferiority, or superiority, will be concluded, if sufficient RCT data about retrograde PCNL available.

Data management: Two independent reviewers will screened the titles and abstracts of the articles and subsequently performed full-text screens of the potentially relevant articles. Two reviewers extracted the baseline demographics and clinical characteristics (i.e., age, sex) of the study participants onto a data extraction form and double-checked them.

Quality assessment / Risk of bias analysis: The heterogeneity between studies was quantified according to the heterogeneity statistic I^2 . When $I^2 < 50\%$, we considered that the heterogeneity among the studies was low. In this case, the fixed-effects model Mantel-Haenszel model was used for data analysis. Cochrane risk of bias assessment was used to explore sources of bias in included randomized trials. Allow for that Single-arm trials have a high risk of bias by their nature, in some cases, they might not be further assessed for bias in our procedure. cochrane tools

Strategy of data synthesis: Stata for data analysis, random effect combined effect size for those with heterogeneity ($i^2 > 50\%$, and $p < 0.1$), fixed effect combined effect size without heterogeneity.

Subgroup analysis: Risk assessment and meta-analysis of studies were performed using RevMan 5.3 software. The heterogeneity between studies was quantified according to the heterogeneity statistic I^2 . When $I^2 < 50\%$, we considered that the heterogeneity among the studies was low. In this case, the fixed-effects model Mantel-Haenszel model was used for data analysis. Statistical analysis will be performed using The DerSimonian and Laird random-effects model. Subgroup

analyses will be performed according to the access creation time, blood loss during the procedure, if enough accessible data.

Sensitivity analysis: Stata performs sensitivity analysis to reflect the sensitivity of the article by deleting the effect size after one of them. When low-quality studies were found in sub-group, or instable results were encountered, sensitivity analysis will be taken with Regression analysis, or Variance-based methods.

Language restriction: None.

Country(ies) involved: China.

Keywords: renal, kidney, calculus, calculi, retrograde, percutaneous, nephrolithotomy.

Dissemination plans: Results of this Meta-analysis is planed to be published in professional scholarly journals. If supported by this meta-analysis, we would like to see the revitalization of the retrograde PCNL, and promote this technique via professional conferences.

Contributions of each author:

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