INPLASY PROTOCOL

To cite: Yu et al. Diagnostic accuracy of Xpert MTB/RIF Ultra for tuberculous pleurisy: A protocol of systematic review and meta-analysis. Inplasy protocol 202080047. doi: 10.37766/inplasy2020.8.0047

Received: 11 August 2020

Published: 11 August 2020

Corresponding author:
Da Chen

chenda234@126.com

Author Affiliation:
Zhejiang Chinese Medicine and Western Medicine Integrated Hospital

Support: **None**

Review Stage at time of this submission: **The review has not yet started.**

Conflicts of interest:
None.

Diagnostic accuracy of Xpert MTB/RIF Ultra for tuberculous pleurisy: A protocol of systematic review and meta-analysis

Yu, G[1]; Shen, Y[2]; Zhu, P[3]; Chen, D[4].

Review question / Objective: **This study aims to evaluate the diagnostic accuracy of Xpert MTB/RIF Ultra for tuberculous pleurisy (TBP) using meta-analysis method.**
Condition being studied: **Tuberculous pleurisy (TBP) is the most common extrapulmonary tuberculosis, but its early diagnosis is still very challenging. Xpert MTB/RIF Ultra is used in the diagnosis of extrapulmonary tuberculosis, and has achieved good diagnostic efficacy. However, the diagnostic accuracy of Xpert MTB/RIF Ultra on TBM has not been studied well.**
Information sources: **We will search Embase, PubMed, the Cochrane Library, China National Knowledge Infrastructure (CNKI), and the Wanfang database for researches.**

INPLASY registration number: This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 11 August 2020 and was last updated on 11 August 2020 (registration number INPLASY202080047).

INTRODUCTION

Review question / Objective: **This study aims to evaluate the diagnostic accuracy of Xpert MTB/RIF Ultra for tuberculous pleurisy (TBP) using meta-analysis method.**

Rationale: **The application of Xpert MTB/RIF Ultra in the diagnosis of TBP has its unique advantages.**

Condition being studied: **Tuberculous pleurisy (TBP) is the most common extrapulmonary tuberculosis, but its early**

diagnosis is still very challenging. Xpert MTB/RIF Ultra is used in the diagnosis of extrapulmonary tuberculosis, and has achieved good diagnostic efficacy. However, the diagnostic accuracy of Xpert MTB/RIF Ultra on TBM has not been studied well.

METHODS

Search strategy: Guocan Yu and Yanqin Shen will conduct the search strategies. No language restrictions in our search process. Search strategy of PubMed will be listed as follows: #1 "Tuberculosis, Pleural"[Mesh] OR “Pleural Tuberculoses” OR “Pleural Tuberculosis” OR “Pleural TB” OR “Tuberculoses, Pleural” OR “Pleurisy, Tuberculous” OR “Pleurisies, Tuberculous” OR “Tuberculous Pleurisies” OR “Tuberculous Pleurisy” OR "Pleural Effusion"[Mesh] OR “Effusion, Pleural” OR “Effusions, Pleural” OR “Pleural Effusions” OR “Extrapulmonary tuberculosis” OR “Extra pulmonary tuberculosis” #2 “Xpert Ultra” OR “GeneXpert Ultra” #3 #1 AND #2.

Participant or population: Patients with TBP.

Intervention: Xpert MTB/RIF Ultra.

Comparator: Comparator is not a obligatory criteria (single arm study can be enrolled if P, I ,O is satisfied because this study will measure the diagnostic accuracy of Xpert MTB/RIF Ultra for TBP).

Study designs to be included: Any types of studies can be enrolled.

Eligibility criteria: Full-text original researches that assessed the Xpert MTB/RIF Ultra assay for TBP will be included. Clear and appropriate reference standards are defined in researches. True positive (TP), false positive (FP), false negative (FN), and true negative (TN) values for the assay can be extracted or calculated directly from the studies. We will exclude case reports, articles written in languages other than Chinese and English, researches with < 10 specimens, conference reports, and abstracts without full articles.

Information sources: We will search Embase, PubMed, the Cochrane Library, China National Knowledge Infrastructure (CNKI), and the Wanfang database for researches.

Main outcome(s): The main outcome will be measured in terms of sensitivity and the specificity of the diagnostic test of interest. Sensitivity refers to the probability that the index test result will be positive in an infected case. Specificity refers to the probability that the index test result will be negative in a non-infected case.

Data management: Guocan Yu and Yanqin Shen will conduct the search strategies. No language restrictions in our search process. Primary search records will be imported into ENDNOTE X9.2 literature management software, according to eligibility criteria. Two investigators (Guocan Yu and Yanqin Shen) will independently assess the candidate articles by reviewing their titles and abstracts, followed by the full text, for inclusion. Discrepancies between the two investigators will be resolved by discussion with a third investigator (Da Chen). We will extract data including first author name; publication year; country; TP, FP, FN, and TN values for the assay; reference standard; patient selection method; specimen type; some steps (e.g., homogenization); and condition along with other parameters. The same two investigators will independently extract the necessary information from each of the included articles; we will cross-check the information they obtained. Discrepancies in the two data sets will be settled by a discussion with a third investigator, similar to that used during the literature selection phase. Data from studies against two different reference standards will be treated separately.

Quality assessment / Risk of bias analysis: The two investigators will independently use a revised tool for Quality Assessment of Diagnostic Accuracy Studies (QUADAS-2) to assess study quality separately and the discrepancy between reviewers will be solved by discussion with

a third investigator (Da Chen). According to the PRISMA-DTA statement, systematic review and meta-analysis of diagnostic test accuracy studies was not required to assess publication bias.

Strategy of data synthesis: We will first obtain the values corresponding to TP, FP, FN, and TN in each included study, and calculated the estimated pooled sensitivity and specificity of Xpert TB/RIF Ultra associated with the 95% confidence interval (CI), against CRS or culture, using bivariate random-effects models. Forest plots for sensitivity and specificity will be generated for each study. The areas under summary receiver operating characteristic (SROC) curves (AUC) will be subsequently calculated. I2 statistics will be used to assess heterogeneity between the studies and a reference standard. While 0% will indicate no observed heterogeneity, values greater than 50% will be considered to imply substantial heterogeneity. We will explore different types of samples, different patient selection method, decontamination methods, sample conditions, and homogenization as potential sources of heterogeneity, using subgroup and meta-regression analyses. At least four published studies will be required to perform the meta-analysis for predefined variable types. Stata version 15.0 (Stata Corp., College Station, TX, USA) with the midas command packages will be used to generate forest plots of sensitivity and specificity with 95% CI for each study and carry out meta-analyses and meta-regression analyses.

Subgroup analysis: If the necessary data are available, subgroup analyses will be done to evaluate the diagnostic accuracy of Xpert MTB/RIF Ultra for TBP. Such as different specimen type, patient selection method, decontamination method, sample condition, method of homogenization.

Sensibility analysis: Sensitivity analysis will be used to explore the source of heterogeneity when the heterogeneity is obvious.

Language: No restriction.

Country(ies) involved: China.

Other relevant information: The strength of the body of evidence will be assessed using The Grading of Recommendations Assessment, Development and Evaluation (GRADE) guideline.

Keywords: Diagnostic accuracy, Xpert Ultra, tuberculous pleurisy, meta-analysis.

Contributions of each author:
Author 1 - Guocan Yu - The author drafted the manuscript, searched databases, selected literatures, managed data and assessed quality.
Author 2 - Yanqin Shen - The author searched databases, selected literatures, managed data and evaluated quality.
Author 3 - Pengfei Zhu - The author drafted and revised the manuscript.
Author 4 - Da Chen - The author provided statistical expertise, read, feedback and approved the final manuscript.