INPLASY PROTOCOL

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The authors report no competing interests.

Transcranial sonography of substantia nigra for differential diagnosis of Parkinson's disease and other movement disorders: A Meta-analysis

Mei, YL[1]; Liu, XJ[2]; Yuan, YP[3]; Li, LJ[4]; Xu, YM[5]; Yang, J[6].

Review question / Objective: **This Meta-analysis aims to evaluate the accuracy of Hyperechogenicity of Substantia Nigra (SN) for differential diagnosis of Parkinson's disease (PD) and other movement disorders.**

Condition being studied: **Parkinson's disease (PD) is a common neurodegenerative disease. Tremor, rigidity, bradykinesia, and postural instability are the primary motor symptoms of PD. However, depression, dementia, Rapid eye movement sleep disorder (RBD), olfactory dysfunction, and other non-motor symptoms often confuse patients with PD. At present, the diagnosis of PD is mainly based on clinical history and motor symptoms. However, many other movement disorders, such as Parkinson-plus syndrome, essential tremor, and secondary Parkinson's syndrome, can also manifest parkinsonian symptoms, which brings some difficulties to the clinical diagnosis of PD. Transcranial sonography (TCS) of substantia nigra(SN) has been proved to be able to distinguish PD from healthy controls and other neurological diseases. However, these previous studies usually have a small sample size, and some studies only explore the diagnostic value of TCS of SN between PD and healthy controls. Data from some previous meta-analysis have demonstrated the diagnostic value of TCS for PD, but the control groups of the included studies are either healthy controls or Parkinson-plus syndrome without other kinds of movement disorders. Therefore, we performed a meta-analysis to assess the value of TCS for the differential diagnosis of PD from other movement disorders.**

INPLASY registration number: This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 18 June 2020 and was last updated on 18 June 2020 (registration number INPLASY202060068).

INTRODUCTION

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Condition being studied: Parkinson's disease (PD) is a common neurodegenerative disease. Tremor, rigidity, bradykinesia, and postural instability are the primary motor symptoms of PD. However, depression, dementia, Rapid eye movement sleep disorder (RBD), olfactory dysfunction, and other non-motor symptoms often confuse patients with PD. At present, the diagnosis of PD is mainly based on clinical history and motor symptoms. However, many other movement disorders, such as Parkinson-plus syndrome, essential tremor, and secondary Parkinson's syndrome, can also manifest parkinsonian symptoms, which brings some difficulties to the clinical diagnosis of PD. Transcranial sonography (TCS) of substantia nigra(SN) has been proved to be able to distinguish PD from healthy controls and other neurological diseases. However, these previous studies usually have a small sample size, and some studies only explore the diagnostic value of TCS of SN between PD and healthy controls. Data from some previous meta-analysis have demonstrated the diagnostic value of TCS for PD, but the control groups of the included studies are either healthy controls or Parkinson-plus syndrome without other kinds of movement disorders. Therefore, we performed a meta-analysis to assess the value of TCS for the differential diagnosis of PD from other movement disorders.

METHODS

Participant or population: The participants were idiopathic PD patients according to the United Kingdom Parkinson Disease Society Brain Bank clinical diagnostic criteria and other movement disorders.

Intervention: Evaluation of the accuracy of Hyperechogenicity of Substantia Nigra (SN) for Parkinson's disease.

Comparator: Healthy controls and other movement disorders excluding Parkinson's disease.

Study designs to be included: Diagnostic study.

Eligibility criteria: Inclusion criteria: 1) based on the diagnostic study of Hyperechogenicity of SN for diagnosis of PD. The publication time is limited to 2015 to May 2020; 2)the participants of each study must include PD and other movement disorders; 3) the true positive, false positive, true negative, and false-negative cases could be extracted from the studies. Review articles, letters, conference reports, editorial comments, preface, and articles not published in English were excluded. Other exclusion criteria were: 1) repeatedly published studies; 2) full-text of studies are not available; 3) sample size was less than 35; 4) the control group of studies only contain the healthy volunteers; 5) articles on Parkinsonism , but not idiopathic PD.

Information sources: Relevant studies were identified by searching EMBASE, PubMed, The Cochrane Library, and CNKI (a Chinese database) Database from 2015 to May 2020.In addition, we attempted to acquire unpublished data, but, no appropriate studies were found for inclusion.

Main outcome(s): The value of TCS for the differential diagnosis of PD from other movement disorders.

Data management: The author's surname,year of publication, age,the number of PD cases of each study, control group, cut-off value , diagnostic criteria, and diagnostic values of TCS for differential diagnosis of Parkinson's disease and other movement disorders.

Quality assessment / Risk of bias analysis: The methodological quality of studies was assessed according to the revised version of the Quality Assessment of studies of Diagnostic Accuracy Studies (QUADAS-2).

Strategy of data synthesis: Stata 15.0 and Meta-Disc 1.4 software will be used to perform the final data combination and meta-analysis.We also conducted publication bias and sensitivity analyses to assess the robustness of the results.

Subgroup analysis: Subgroup meta-analyses were performed by the different ages of PD, simple sizes, and quality assessment scores among the included studies.

Sensibility analysis: Sensitivity analysis will be conducted to assess the robustness of the results.

Language: The studies published in English will be included in this meta-analysis.

Country(ies) involved: China.

Keywords: Transcranial sonography, Parkinson's disease, substantia nigra, Meta-analysis, diagnosis.

Contributions of each author:
Author 1 - Mei Yanliang - Author 1 drafted the manuscript.
Author 2 - Liu Xiaojing - The author provided statistical expertise.
Author 3 - Yuan Yanpeng - The author contributed to the development of the selection criteria, and the risk of bias assessment strategy.
Author 4 - Li Lanjun - The author contributed to the development of the selection criteria, and the risk of bias assessment strategy.
Author 5 - Xu Yuming - The author read, provided feedback and approved the final manuscript.
Author 6 - Yang Jing - The author read, provided feedback and approved the final manuscript.