

INPLASY PROTOCOL

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None declared.

A meta-analysis on the application of diffusion tensor imaging (DTI) in the diagnosis of HIV-associated neurocognitive disorders (HAND)

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Review question / Objective: The main goal of this meta-analysis is to explore the application of diffusion tensor imaging in the diagnosis of HIV-associated neurocognitive disorders, and to explore possible brain damage and changes in image-related parameters in HIV-positive patients.

Condition being studied: Human immunodeficiency virus (HIV) affects more than 1 million individuals in the United States and over 40 million people worldwide. More than half of all HIV positive individuals in the United States are expected to be greater than 50 years old by 2015. HIV infected individuals receiving cART can now expect to live almost as long as HIV-uninfected (HIV-) individuals. Despite these advances, eradication of HIV from the brain has not occurred. The prevalence of HIV-associated neurocognitive disorders (HAND) has remained constant (40%) despite more available and effective antiretrovirals. Soon after seroconversion, HIV rapidly spreads throughout the brain.

INPLASY registration number: This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 20 October 2021 and was last updated on 20 October 2021 (registration number INPLASY2021100079).

INTRODUCTION

Review question / Objective: The main goal of this meta-analysis is to explore the application of diffusion tensor imaging in the diagnosis of HIV-associated neurocognitive disorders, and to explore possible brain damage and changes in

image-related parameters in HIV-positive patients.

Rationale: HIV infection can cause inflammation in the brain. Inflammation itself and immune system access can cause neuronal damage, which in turn affects cognitive function. Diffusion tensor imaging can clearly show the changes in

the microstructure of the white matter texture, which is often accompanied by cognitive dysfunction.

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METHODS

Search strategy: We will search articles in two electronic databases including PubMed, Web of Science. All the English publications until 31 August 2021 will be searched without any restriction of countries or article type. Reference list of all selected articles will independently screened to identify additional studies left out in the initial search. (HIV OR HAND OR HIV-associated neurocognitive disorder) AND (DTI OR Diffusion Tensor Imaging OR Neuroimaging OR MRI OR Magnetic Resonance Imaging). The electronic database search will be supplemented by a manual search of the reference lists of included articles.

Participant or population: Inclusion criteria: HIV-positive patients with or without combined antiretroviral therapy, aged over 18 years old. The control group was seronegative healthy volunteers who completed demographic matching such as age, education, and social status. Exclusion criteria: suffering from syphilis, hepatitis B, hepatitis C and other sexual-blood-borne diseases, suffering from schizophrenia, depression, mania and other jingshenjingbing

Intervention: Perform a magnetic resonance examination, complete diffusion weighted imaging and diffusion tensor imaging scans, and obtain parameter values such as average anisotropy and diffusion anisotropy score.

Comparator: Healthy volunteers completed the same routine MRI sequence and DTI sequence for HIV seropositive patients.

Study designs to be included: Cohort study or cross-sectional study.

Eligibility criteria: The data and results of the thesis are true and complete. They are strictly distinguished between the experimental group and the control group and conform to the blinding method. The experimental design is reasonable and the content of the paper is rigorous.

Information sources: Two electronic databases including PubMed, Web of Science. All cited papers have been published or accepted by journals.

Main outcome(s): DTI can be used to trace nerve fibers. Among HIV seropositive patients, especially those diagnosed as asymptomatic neurocognitive impairment (ANI) and mild neurocognitive disorders (MND) through cognitive scale and imaging examination, bilateral insula, The MD value of the internal capsule, the radiated corona area and the dorsal nucleus of the thalamus increased, and the FA value decreased. The MD value may be related to the serum viral load.

Additional outcome(s): After a period of combined antiretroviral therapy (cART) for HIV seropositive patients, cognitive scale tests may change. The change of the RD value of the DTI related parameter may indicate the damage of the nerve myelin sheath, and the AD value is related to the damage of the neuron axon.

Data management: Two reviewers will independently extract data. Any disagreement will be resolved by discussion until consensus is reached or by

consulting a third author. The following data will be extracted: author, year of publication, country where the study was conducted, study period, original inclusion criteria, total number of people included in the study, DTI sequence related parameters (such as FA, MD, AD, RD), demographic information of relevant patients, serum, cognitive scale test results, etc.

Quality assessment / Risk of bias analysis:

Two reviewers will independently assess risk of bias based on the following domains from recommendations from the Cochrane handbook: 1. Adequate sequence generation; 2. Allocation concealment; 3. Blinding; 4. Incomplete outcome data and how it was addressed; 5. Selective reporting of the outcome; 6. Any other biases. Results of bias assessment will be presented in a figure and a graph indicating low, high or unclear risk of bias for each of the 6 items in each trial. Sensitivity analysis will be conducted based on the bias assessment to assess robustness of results.

Strategy of data synthesis: A data extraction form will be developed based on the Cochrane handbook checklist of items to consider for data collection. Two authors will independently extract the data from included studies. Disagreements will be resolved by discussion between the two reviewers and reviewing of the trial information. When needed the trial authors will be contacted for clarifications.

Subgroup analysis: (1) Quantitative judgment, observe whether there is overlap between the parameter values of seropositive patients and the 95% CI of the parameter between the healthy control group. If there is no overlap, it means that the difference between the two groups is statistically significant; (2) Quantitative judgment is based on each The sample size, effect size, and 95% CI of the subgroups were used to calculate the P value of the difference test.

Sensitivity analysis: Change the inclusion criteria (especially the controversial studies), exclude low-quality studies, use

different statistical methods/models to analyze the same data, etc.

Language: Citations are limited to those published in English.

Country(ies) involved: China.

Keywords: DTI, HIV-associated neurocognitive disorders.

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