INPLASY PROTOCOL

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None declared.

Can Artificial Intelligence Be Applied to Diagnose Intracerebral Hemorrhage Under the Background of the Fourth Industrial Revolution? A Novel Systemic Review and Meta-analysis

Zhao, K[1]; Yang, MF[2].

Review question / Objective: **We intended to provide the clinical evidence that artificial intelligence(AI) could be used to assist doctors in diagnosis of intracerebral hemorrhage (ICH).**

Condition being studied: **Studies published in 2021 were identified after literature search of PubMed, Embase and Cochrane. Quality Assessment of Diagnostic Accuracy Studies-2(QUADAS-2) was used to perform quality assessment of studies. Data extraction of diagnosis effect included accuracy(ACC), sensitivity(SEN), specificity(SPE), positive predictive value(PPV), negative predictive value(NPV), area under curve(AUC), Dice scores(Dices). The pooled effect with its 95% confidence interal(95%CI) were calculated by random effects model. I-square (I2) was used to test heterogeneity. To check the stability of overall results, sensitivity analysis was conducted by recalculating the pooled effect of the remaining studies after omitting the study with the highest quality or the random effects model was switched to fixed effects model. Funnel plot was used to evaluate publication bias. To reduce heterogeneity, recalculating the pooled effect of the remaining studies after omitting the study with the lowest quality or perform subgroups analysis.**

INPLASY registration number: This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 14 August 2021 and was last updated on 14 August 2021 (registration number INPLASY202180056).

INTRODUCTION

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METHODS

Participant or population: True positive participates were patients suffered ICH; True negative participates were people without abnormal condition in neuroimaging.

Intervention: Full-automatic or semi-automatic diagnostic conclusions via AI technologies were used to compare with full-manual diagnostic outcomes via professional physician.

Comparator: The gold standard was that professional physicians, who were blind to tests, diagnose ICH or no ICH referring to the International Classification of Diseases and recent international standards guidelines.

Study designs to be included: Diagnostic tests.

Eligibility criteria: Inclusion criteria(1) Language and regions of articles were not restricted; (2) Articles was published in 2021; (3) Diagnostic tests; (4) True positive participates were patients suffered ICH; (5) True negative participates were people without abnormal condition in neuroimaging; (6)The gold standard was that professional physicians, who were blind to tests, diagnose ICH or no ICH referring to the International Classification of Diseases and recent international standards guidelines; (7) Full-automatic or semi-automatic diagnostic conclusions via AI technologies were used to compare with full-manual diagnostic outcomes via professional physician; (8) Analysis or assessment of diagnosis effect was performed completely. Exclusion criteria(1) Duplication; (2) Reviews, comments, letters, case reports, protocols of clinic trials and conference papers; (3) Animal experiments; (4) Contents of articles were irrelevant to this meta-analysis.

Information sources: Literature search was performed in three public electronic databases of PubMed, Embase and Cochrane.

Main outcome(s): All the original data used to assess diagnosis effect were extracted including accuracy(ACC), sensitivity(SEN), specificity(SPE), positive predictive value(PPV), negative predictive value(NPV), area under curve(AUC), Dice scores(Dices) and so on. In addition, some confounders, which might result in errors, were adjusted, including different diagnosis purposes, AI technologies and other factors.

Quality assessment / Risk of bias analysis: The quality assessment of included articles was performed via the Quality Assessment of Diagnostic Accuracy Studies-2 (QUADAS-2) by the software Review Manager 5.3 before data extraction. We considered that the study might be assessed to have higher quality for its larger number of included patients in studies with the same assessment in QUADAS-2. Funnel plot symmetry and Egger's regression were used to evaluate publication bias.

Strategy of data synthesis: Meta-analysis was performed using corresponding modules in Software for Statistics and Data Science (Stata, version 15.1; College Station, Texas 77845 USA). The pooled

effect with its 95%CI were calculated by random effects model.

Subgroup analysis: To reduce heterogeneity, recalculating the pooled effect of the remaining studies after omitting the study with the lowest quality or perform subgroups analysis.

Sensitivity analysis: Sensitivity analysis was performed to evaluate the stability of overall results by recalculating the pooled effect of the remaining studies after omitting the study with the highest quality or the random effects model was switched to fixed effects model.

Country(ies) involved: Countries or regions of articles were not restricted.

Keywords: Artificial Intelligence, Diagnosis, Intracerebral Hemorrhage, Meta-analysis.

Contributions of each author:
Author 1 - Kai Zhao.
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