INPLASY PROTOCOL

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None declared.

Accuracy of artificial intelligence in CT interpretation in covid-19: a systematic review protocol for systematic review and meta-analysis

Hashemi, S[1]; Ferdosian, H[2]; Zamanian, H[3].

Review question / Objective: The aim of this systematic review is to compare the accuracy of artificial intelligence algorithms with radiologist panels in CT interpretation in covid-19.

Condition being studied: COVID-19 disease was reported as the cause of the outbreak of pneumonia at the end of 2019. One of the main complications of COVID-19 is pulmonary involvement which could be diagnosed by CT-scan dominantly. Because of the increasing rate of these patients along with considering patients in remote areas, CT interpretations are a heavy burden on radiologists. Therefore artificial intelligence algorithms have become critical and time-saving systems in decision-making for these patients.

INTRODUCTION

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METHODS

Search strategy: We used the following keywords to find relevant articles: (AI-based OR "artificial intellig*" OR "artificial-intellig*" OR "network-based" OR "learning algorithm*" OR "image processing*" OR "image-processing" OR "neural network*" OR "deep learning*" OR "deep-learning" OR "machine learning*" OR "machine-learning" OR "big data tech*" OR "R program" OR python OR scala OR "artificial neur*" OR "deep neur*" OR "hybrid neur*" OR ensemble OR "data mining*" OR datamining OR "data-mining" OR "reinforcement learning" OR "reinforcement-learning" OR SVM OR "vector* machine*" OR "support vector*" OR "vector* network*" OR "vector* support*" OR "deep unified network*" OR "computational intelligen*" OR "machine* intellig*" OR machine-intellig* OR "learning machine*" OR "learning algorithm*" OR "learning vector*" OR "support-vector*" OR "inductive machine*" OR "inductive learning" OR "supervised learning" OR "deep belief network*" OR "supervised network*" OR "supervised algorithm*" OR "unsupervised learning" OR "unsupervised network*" OR "unsupervised algorithm*" OR "semi-supervised learning" OR "limited supervision" OR "training data" OR "Generative Adversarial Network*") AND (covid* OR "COVID 19" OR "CV19" OR "CV 19" OR "CV-19" OR COVID2019 OR "COVID 2019" OR COVID-2019 OR SARS-CoV-2 OR SARSCoV2 OR SARS-CoV2 OR SARS2 OR "SARS-coronavirus2" OR 2019-nCov* OR nCoV* OR corona OR coronavirus OR "Wuhan seafood market pneumonia virus" OR "Wuhan virus" OR "Wuhan pneumonia") AND ("medical image" OR CT OR "ct scan" OR CT-scan OR tomograph* OR "Computed tomograph*" OR Xraycomputed OR "Xray computed" OR "X-ray computed" OR "computed Xray" OR "computed X-ray" OR "CAT scan" OR "computer assisted tomography" OR "computer-assisted tomography" OR "multidetector computed tomography").

Participant or population: Patients with COVID-19 who had positive RT-PCR.

Intervention: There is no intervention in this study, the main diagnostic test is artificial intelligence algorithm which is used for interpretation of CT- scan. Our main study group is AI-based CT-scan interpretation.

Comparator: Radiologist panels consist of at least 2 radiologists.

Study designs to be included: All diagnostic studies such as randomized or non-randomized clinical trials will be included.

Eligibility criteria: In our study there is no age or gender limits,The comparison group will be normal or all lung diseases. We excluded HRCTs , we excluded the cases if AI were based on CT and CXR ,if there was only one radiologist in panel the article excluded.

Information sources: The following databases were searched PUBMED, Web Of Science core collection, Embase, SCOPUS till 4/5/2021.

Main outcome(s): All CT findings including opacities, important signs will be considered as outcome in this review such as multifocal small patchy shadows, ground glass opacity (GGO), and consolidation.

Data management: All retrieved articles were exported into ENDNOTE and then RAYYAN soft wares for screening and team work management then results will be screened by at least two independent reviewers and any disagreements were solved by consensus or a third reviewer. Data will be extracted from all studies according to data extraction form(an EXCEL worksheet) by two independent reviewers. We will extracting data such as country , year, author, sample size,study type, effect size parameters…

Quality assessment / Risk of bias analysis:
JBI clinical appraisal tool (check list for diagnostic test accuracy studies) will be used for quality assessment articles by two independent reviewers.

Strategy of data synthesis: Effect size parameters will be extracted from articles and will be entered to STATA for quantitative synthesis. FOREST PLOT and heterogeneity level will be determined. Considering heterogeneity, level effect model will be determined. If heterogeneity is >50% random effect model will be used.

Subgroup analysis: We will perform subgroup analysis based on gender , age...

Sensitivity analysis: None.

Country(ies) involved: Iran.

Keywords: Artificial intelligence, COVID_19, CT_scan, Accuracy.

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