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Rabies Test Accuracy: Comprehensive Systematic Review and Meta-Analysis for Human and Canine Diagnostics

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ADMINISTRATIVE INFORMATION

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Review Stage at time of this submission - Completed but not published.

Conflicts of interest - None declared.

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Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 4 November 2024 and was last updated on 4 November 2024.

INTRODUCTION

Review question / Objective This study aims to gather comprehensive data on the diagnostic performance of laboratory tests for rabies in both humans and dogs, focusing on their sensitivity and specificity. The objective is to identify the most reliable diagnostic tools for rabies, thereby enhancing clinical decision-making and informing public health interventions.

Condition being studied Rabies is a viral disease that affects the central nervous system, causing acute encephalitis in both humans and animals. It is primarily transmitted through the bite of infected animals, most commonly dogs. Once clinical symptoms appear, rabies is almost invariably fatal, making early diagnosis crucial for effective intervention. The disease progresses rapidly, initially presenting with non-specific symptoms such as fever and headache, followed by

neurological manifestations like agitation, hallucinations, and hydrophobia. Without timely and appropriate medical intervention, rabies leads to death within days. Given its high mortality rate and the public health risks it poses, accurate diagnosis and prevention strategies are essential for controlling its spread.

METHODS

Participant or population The review will focus on studies conducted in dogs and humans.

Intervention Diagnostic tests and control groups.

Comparator Accuracy of diagnostic techniques for rabies-infected dogs and humans.

Study designs to be included Infection and diagnostic types of studies.

Eligibility criteria This systematic review includes studies assessing the diagnostic accuracy of laboratory tests for rabies in humans and dogs, focusing on sensitivity and specificity. The review encompasses randomized controlled trials, observational studies, and cohort studies published in peer-reviewed journals.

Information sources The searches will be focused on PubMed(<https://pubmed.ncbi.nlm.nih.gov/>).

Main outcome(s) The results highlight the effectiveness of immunological tests, such as enzyme-linked immunosorbent assay (ELISA), and molecular tests, like reverse transcription polymerase chain reaction (RT-PCR), for diagnosing rabies in humans. Similarly, in dogs, immunological tests, rapid immunochromatographic tests (RIT), ELISA, and RT-PCR proved to be reliable diagnostic methods. When compared to the direct fluorescent antibody test (DFAT), there was significant variability and reduced diagnostic accuracy. Both ELISA and RT-PCR provided more consistent and dependable results, while RIT demonstrated the highest performance, with superior sensitivity and specificity, surpassing traditional methods. These findings emphasize the need to reassess and update rabies diagnostic protocols by incorporating advanced diagnostic technologies.

Quality assessment / Risk of bias analysis The final selection of studies was determined after a thorough screening of titles, abstracts, and full texts by two reviewers. Any discrepancies were resolved through discussion or by consulting a third reviewer for consensus.

Strategy of data synthesis The data will be analyzed within the R environment.

Subgroup analysis The data will be analyzed within the R environment.

Sensitivity analysis The data will be analyzed within the R environment.

Country(ies) involved Peru, Brazil.

Keywords Rabies; diagnostic tests; meta-analysis; systematic review; sensitivity; specificity.

Contributions of each author

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