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REVIEW ARTICLE

Diagnostic Accuracy of the ACT-FAST Tool for Prehospital Stroke Identification: A Systematic Review

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Abstract: **Introduction:** Stroke is the second leading cause of death globally, resulting in 5.5 million deaths annually. The ACT-FAST is a simplified, rapid assessment tool aimed at improving the early detection of stroke and may outperform existing tools in identifying large vessel occlusions (LVOs). We aimed to assess the diagnostic accuracy of this tool in this systematic review. **Methods:** In this systematic review, we conducted a comprehensive search of Medline, Scopus, Web of Science, and Embase. Studies with incomplete data reporting or those focusing on other triage tools were excluded. Two independent reviewers screened titles, abstracts, and full texts, and extracted relevant data using a pre-designed checklist. **Results:** Our systematic review identified four studies on the ACT-FAST tool, all conducted primarily in Australia with a predominantly elderly patient population. Reported findings indicate that ACT-FAST has demonstrated generally high diagnostic performance, with retrospective analyses showing accuracies above 90%. Sensitivity varied across study designs, ranging from 63% to 100%, while specificity was consistently reported above 85%. Despite concerns regarding potential bias from non-random patient selection and incomplete reporting of symptom onset, the overall methodological quality was robust. **Conclusion:** The ACT-FAST algorithm demonstrates generally high, though variable, sensitivity and consistently high specificity, supporting its utility as a valuable tool for paramedics and clinicians in prehospital stroke management and for effectively identifying patients with LVO. This capability facilitates timely intervention, minimizes unnecessary transfers for patients without LVO, and optimizes resource allocation, ultimately improving patient outcomes in stroke care.

Keywords: Arterial occlusive diseases; Clinical decision rules; Systematic review

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1. Introduction

Stroke is the second leading cause of death worldwide, affecting approximately13.7 million people and resulting in 5.5 million deaths annually (1). Between 1990 and 2016, stroke rates doubled in low- and middle-income countries, while high-income countries experienced a 42% decrease during the same period (2). The World Health Organization (WHO) and the American Stroke Association (ASA) emphasize the importance of rapid and accurate pre-hospital stroke recognition to enable early therapeutic intervention, particularly the administration of thrombolytics within the critical therapeutic window (3, 4).

Delays in recognition are associated with increased mortality, particularly in cases such as cerebellar stroke, as well as a higher risk of recurrent events. Complicating diagnosis further, up to 30% of patients with stroke-like presentations are ultimately found to have stroke mimics, including seizures and migraine (5). Therefore, distinguishing true stroke from mimicking conditions at an early stage is essential for guiding appropriate therapy, especially since many mimics are treatable themselves (6).

In some regions, prehospital protocols are used for suspected large vessel occlusion (LVO) strokes, relying on clinical scales such as the Rapid Arterial Occlusion Evaluation (RACE), Los Angeles Motor Scale (LAMS), Field Assessment Stroke Triage for Emergency Destination (FAST-ED), Cincinnati Stroke Triage Assessment Tool, and Prehospital Acute Stroke Severity Scale. However, these approaches still require further validation, as identifying LVO can be challenging (7-

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13). Misdiagnosis can lead to patients without LVO being diverted away from the nearest primary stroke center, delaying critical treatments like thrombolysis (14).

Timely assessment and specialist intervention are essential for achieving favorable outcomes in acute stroke. LVO strokes, which carry mortality rates as high as 80% (15), are most effectively managed with intravenous (IV) thrombolysis followed by mechanical thrombectomy (MT). While IV thrombolysis is widely available in general hospitals, MT requires specialized neurointerventional centers. Because the effectiveness of reperfusion therapy depends on its administration within the first hours after symptom onset (16, 17), a reliable triage system is needed to identify eligible patients at the earliest opportunity. Equally important is the ability to rule out intracranial hemorrhage and stroke mimics, as inappropriate use of thrombolysis can be harmful. An optimal triage system, particularly in prehospital settings, could guide both immediate management and decisions regarding transfer to appropriate treatment facilities (18).

The Ambulance Clinical Triage for Acute Stroke Treatment (ACT-FAST) tool is a simplified, rapid assessment tool designed to improve early stroke detection. It builds on the widely adopted FAST criteria (Facial drooping, Arm weakness, Speech difficulties, and Time) by incorporating additional cortical signs, making it particularly effective for identifying LVO strokes; however, their performance in detecting basilar artery occlusions is limited (4, 19, 20). It involves a three-step assessment: evaluation of arm drift, detection of cortical signs such as language deficits, gaze deviation, or hemispatial neglect, and determination of eligibility for endovascular thrombectomy. It builds on the traditional FAST criteria including Facial drooping, Arm weakness, Speech difficulties, and Time by incorporating additional cortical signs (4).

Several studies have investigated the sensitivity and specificity of ACT-FAST compared to other stroke recognition tools, such as the Cincinnati Prehospital Stroke Scale and the Los Angeles Prehospital Stroke Screen. These studies indicate that ACT-FAST may provide superior accuracy in certain clinical situations, particularly for detecting LVO strokes (4, 21). Prehospital use of the ACT FAST algorithm by paramedics has demonstrated strong agreement with physician assessment in the emergency department, supporting its reliability for early identification of large vessel occlusion. However, subtle differences in diagnostic performance exist between paramedics and physicians, particularly for less typical or more complex occlusions, indicating that while paramedic triage can effectively expedite endovascular pathways, ongoing evaluation and training are important to ensure consistent accuracy across diverse stroke presentations (4).

This systematic review aims to assess the diagnostic accuracy of the ACT-FAST tool for stroke recognition, specifically in pre-hospital and emergency settings. By evaluating its sensitivity, specificity, and clinical effectiveness, we seek to determine how ACT-FAST can improve stroke care pathways.

2. Methods

2.1. Study design and setting

The present study was conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) 2020 guidelines (22). Study question was designed using the PIT framework: P (Population): Patients presenting with stroke symptoms; I (Index test): Application of the ACT-FAST triage tool; T (Target condition): Presence of stroke confirmed by neuroimaging including Computed Tomography (CT) scan, Computed Tomography Angiography (CTA), Computed Tomography Perfusion (CTP) or Magnetic Resonance Angiography (MRA). All studies whether the ACT-FAST assessment was conducted in the prehospital setting or within the emergency department (ED) were included to provide a comprehensive evaluation of its diagnostic performance across different clinical environments.

2.2. Search strategy

A comprehensive search was conducted on Medline (via PubMed), Scopus, Web of Science, and Embase databases from inception to August 4th 2025. The keywords were selected for search queries using MeSH terms and Emtree terms as well as their synonyms. The search strategy was then discussed with an expert in this field. A manual search was performed across grey literature, Google Scholar, the Google search engine, and reference lists of relevant articles to avoid missing any articles. The detailed search strategy is provided in Supplementary Material 1.

2.3. Inclusion and exclusion criteria

All human studies assessing the diagnostic accuracy of ACT-FAST in diagnosing stroke and large vessel occlusions were included in this systematic review. Studies with incomplete data reporting, studies focusing on outcomes other than stroke, studies utilizing other triage tools, reviews, abstracts, and duplicate articles were excluded from the present systematic review.

2.4. Study selection and data extraction

Reports were exported into EndNote software (version 21; Thomson Reuters, Toronto, ON, Canada). After removal of duplicates two independent reviewers screened titles and abstracts. Afterwards, the full texts of potentially relevant studies were retrieved and studied by two independent reviewers. The data of included studies were imported in a pre-designed checklist. The excel checklist consisted of the following items: Author, year, country, age, sex, specialty of the assessor, reference standard, type of stroke, definition of stroke, and diagnostic outcomes including sensitivity, specificity, positive predicting value (PPV) and negative predicting value (NPV), accuracy, and area under the curve.

2.5. Quality assessment

The risk of bias was assessed using QUADAS-2 tool for systematic reviews of diagnostic accuracy studies by two independent reviewers. Any disagreements during study selection, data extraction or quality assessment were resolved through consultation with a third reviewer.

3. Results

3.1. Study selection

We conducted a systematic search in PubMed, Scopus, Embase and Web of Science (WoS) databases. Systematic search yielded 166 articles, of which 78 were duplicates. After initial and full text screening, a total of four studies were included in the present systematic review. The details are provided in figure 1.

3.2. Characteristics of the included studies

All published studies on ACT-FAST were conducted in Australia. The sex distribution was nearly equal in all studies, and the majority of patients were elderly (table 1). Zhao et al., who originally presented ACT-FAST in 2018, evaluated its diagnostic accuracy in three phases (4). ACT-FAST was initially developed to aid in the recognition of large vessel occlusion (LVO). Diagnostic accuracy was assessed using LVO, defined as the occlusion of the intracranial internal carotid artery or the proximal M1 segment of the middle cerebral artery on baseline computed tomographic angiography, with a National Institutes of Health Stroke Scale (NIHSS) score ≥6, in accordance with American Heart Association (AHA) Class 1 recommendations for endovascular thrombectomy (23). The ACT-FAST protocol underwent retrospective validation in 565 consecutive paramedic-initiated code stroke cases, with the dataset registry previously published (24). For prospective validation, data from 104 patients were analyzed, and a total of 93 paramedic crews participated in the study. The patients were 49.1% male, with a mean age of 69 years (range: 21–93). In a subsequent phase, paramedics applied the full ACT-FAST algorithm de novo in a separate cohort of 60 patients.

In a separate study, Zhao et al. further evaluated ACT-FAST in a prospective study, where paramedics assessed suspected stroke patients using the prehospital ACT-FAST algorithm (25). A total of 522 evaluations were performed, with five cases excluded due to missing data. Among the remaining 517 records, 50.2% of the patients were male, with a mean age of 72.3 ± 15.6 years.

Ostman et al. assessed ACT-FAST scores upon patient arrival at the emergency department before brain imaging (20). Their analysis included 147 stroke patients, of whom 21 were excluded due to brain hemorrhage or incomplete clinical data. The median age of patients in their study was 69 years. Tan et al. retrospectively analyzed 1,216 stroke presentations, of which 88 cases (7%) were ACT-FAST positive with a median age of 80 years (26). The review of medical records was conducted by an acute stroke nurse after a paramedic or physician confirmed that the patients met the ACT-FAST criteria.

3.3. Diagnostic performance of the ACT-FAST tool

Diagnostic performance of the algorithm was reported for different types of strokes in the studied papers using retrospective and prospective designs. Also, the assessment was performed by different health care providers in the studies. The details are presented in table 1. In the retrospective validation phase of the study by Zhao et al., the prevalence of LVO was 8.3% according to AHA criteria. In this phase, ACT-FAST demonstrated superior diagnostic accuracy (92.4%), specificity (93.1%), and PPV (52.6%), but lower sensitivity (85.1%) and NPV (98.6%) compared to existing LVO triage scales. However, in the prospective phase, ACT-FAST showed superior performance across all parameters compared to other scales, with the distinction more evident when intracerebral hemorrhage (ICH) was excluded. The ACT-FAST accuracy reached 89.0%, with sensitivity of 100%, specificity of 87.2%, PPV of 56.0%, and NPV of 100%. During the validation of ACT-FAST algorithm, an accuracy of 91.7%, sensitivity of 85.7%, and specificity of 93.5% were calculated. Sensitivity was lower (75.0%) when basilar artery occlusions and other stroke cases accepted for endovascular therapy were included, but specificity remained high at 93.2% (4). In the consecutive study of Zhao et al. diagnostic accuracy of ACT-FAST algorithm was reported in four different stroke categories, with sensitivity ranging from 70.1% to 82.6% and specificity of 75.4-89.5%. Zhao et al. concluded that the ACT-FAST algorithm, when used as a bypass strategy for endovascular thrombectomy (EVT), substantially expedited care and reduced secondary transfers. The risks of delayed thrombolysis and over-triage were minimal, and only a small proportion of EVT patients were missed (25).

While the initial validation studies by Zhao et al. demonstrated high overall diagnostic accuracy for ACT-FAST, findings from subsequent prospective cohorts revealed that its sensitivity varied across stroke subtypes. In particular, performance declined in identifying extended large vessel occlusions (ELVO) and posterior circulation or distal M2 occlusions, as reported by Ostman et al. (2022) (20) and supported by Tan et al. (2022) (26). Although both studies confirmed high specificity (92–97%) and strong predictive value for anterior circulation LVOs, sensitivities as low as 47% for ELVO and 7% for proximal M2/basilar occlusions were observed. These results indicate that ACT-FAST's diagnostic capability is not uniformly high across all occlusion sites, highlighting the need for cautious interpretation of its accuracy, particularly when applied to posterior or distal vessel strokes in real-world prehospital settings.

However, sensitivity (92%) and specificity (97%) for the ACT-FAST algorithm were both favorable in the study of tan et al. (26). The details are summarized in table 2.

3.4. Risk of bias assessment

There were some concerns in the overall risk of bias assessment of all of the included studies. The patient selection was not random in any of the included papers. Also, only one of the included papers have reported the time interval between the initial symptoms. One study was retrospective and the studies of Zhao et al. have not reported the time interval. There were no concerns regarding test and the reference standard. Details are provided in table 3.

4. Discussion

The success of endovascular therapy (EVT) for LVO strokes critically depends on the swift recognition of severe stroke symptoms by emergency medical services (EMS) personnel. Rapid transport to a comprehensive stroke center (CSC) equipped to perform EVT can significantly improve patient outcomes. However, the limited number of hospitals capable of providing EVT leads to delays in identifying and transferring eligible patients, posing a substantial barrier to delivering optimal care (12).

The ACT-FAST algorithm has shown strong diagnostic performance in prehospital stroke identification; however, sensitivity varies depending on occlusion type, with slightly lower performance for posterior circulation and M2 lesions. Additionally, subtle differences exist between assessments performed by paramedics in the field and physicians in the emergency department, emphasizing the importance of ongoing evaluation and training.

The exact protocol of this severity-based triage strategy is provided in supplementary material 2. Its ability to swiftly exclude non-LVO stroke patients in mere seconds sets it apart from traditional triage scales, which often require more time for completion and interpretation. In the retrospective phase of Zhao et al.'s study, ACT-FAST achieved superior diagnostic accuracy (92.4%), specificity (93.1%), and positive predictive value (PPV) (52.6%) compared to existing LVO triage scales, although its sensitivity was slightly lower at 85.1%. Notably, in the prospective phase, ACT-FAST's sensitivity increased to 100%, with an overall accuracy of 89%, further underscoring its utility when intracerebral hemorrhage (ICH) was excluded. These findings suggest that ACT-FAST has the potential to minimize secondary transfers by directing patients straight to EVT-capable centers, thereby expediting care without increasing the risk of delayed thrombolysis (4).

In comparison, other tools like FAST-ED have exhibited variable performance. Several studies report that FAST-ED's sensitivity for LVO detection, when used by emergency physicians or paramedics, ranges from 0.72 to 0.79, with specificity between 0.76 and 0.79. The concerning false negative rates (22.5% to 28.8%) at critical cut-off points indicate that a significant number of stroke patients may be overlooked. Conversely, validation studies for ACT-FAST show a substantially higher specificity (up to 93.5%), thus reducing the likelihood of missed LVO cases (27).

The differences in diagnostic performance among these tools may arise from several factors. A key distinction is that ACT-FAST provides more specific guidance to paramedics, potentially bridging the gap between expert neurologists and EMS personnel in the field (4). In contrast, FAST-ED seems more reliant on the skill and experience of the examiner; studies have shown that neurologists achieve higher diagnostic accuracy with FAST-ED compared to emergency medical technicians, likely due to their extensive training in stroke diagnosis and ability to assess patients later in the progression of symptoms, making LVO signs more apparent (27).

Emerging technologies, such as portable transcranial Doppler (TCD), offer the potential to complement clinical assessments by providing non-invasive, real-time imaging in the field. However, these technologies come with limitations, as their application necessitates specialized training and skilled technicians to ensure accurate and effective use (12). In contrast, the ACT-FAST tool is designed for user-friendliness, requiring no advanced technical skills, which enhances its accessibility for healthcare providers without the need for high-tech equipment or specialized training. This simplicity represents a critical advantage for time-sensitive, prehospital stroke diagnosis (4).

Further research is essential to fully explore the potential of ACT-FAST, particularly regarding its sensitivity in detecting less common stroke types, such as basilar artery occlusions, where its performance has been less robust. For instance, results from Ostman et al. indicated a sensitivity of 63% for LVO and 47% for embolic LVO, although specificity remained high at 92%. This highlights the necessity for further validation and refinement of ACT-FAST to enhance its applicability for broader stroke identification, particularly in challenging cases like M2 or basilar artery occlusions (21).

Another assessment tool, the ROSIER (Recognition of Stroke in the Emergency Room) scale, was introduced in 2005 to evaluate stroke in emergency settings (28). It considers various factors, including consciousness level, seizure activity, and speech impairment, and demonstrates high diagnostic accuracy with a sensitivity of 0.89 and specificity of 0.76 (29). However, while tools like ACT-FAST are specifically designed for rapid LVO identification, emphasizing speed and simplicity for EMS personnel who may not possess advanced clinical training, ROSIER captures a broader range of stroke presentations and mimics. Thus, ACT-FAST is particularly tailored for time-sensitive, severe cases, where rapid intervention is critical for improving outcomes (29).

In addition to ACT-FAST, other prehospital stroke scales such as FAST and BEFAST have also been systematically evaluated. A meta-analysis by Chen et al. (2022), including 6,151 participants, reported that FAST demonstrated moderate sensitivity (0.77) and specificity (0.60) for acute ischemic stroke, whereas BEFAST improved specificity to 0.85, though with slightly lower sensitivity (0.68), particularly enhancing detection of posterior circulation strokes. Similarly, a recent systematic review and meta-analysis on Cincinnati Prehospital Stroke Scale (CPSS) for LVO detection found that a threshold of ≥2 provided a balanced sensitivity (82%) and specificity (62%), whereas higher thresholds increased specificity at the expense of sensitivity (Baser et al., 2023) (30, 31). These findings illustrate the trade-offs between sensitivity and specificity in simpler prehospital scales, which contrasts with ACT-FAST's consistently high specificity and relatively stable sensitivity across studies, particularly in detecting classic LVOs.

The RACE (Rapid Arterial Occlusion Evaluation) scale, introduced by de la Ossa et al.(13), also serves to assess LVO diagnostic efficacy. Another review highlights that the RACE scale demonstrates a sensitivity of 0.86 at a cut-off of ≥3, which is commendable but paired with a specificity of only 0.57 (32). In contrast, ACT-FAST not only offers a rapid assessment for LVO but also sustains higher specificity, thus serving as a more balanced choice for minimizing misdiagnoses in prehospital settings. While the RACE scale is effective in identifying severe stroke symptoms, its non-binary scoring system complicates interpretation and necessitates nuanced evaluation skills. This limitation may make it difficult to use for paramedics or EMS personnel, who may not have extensive training. Conversely, ACT-FAST's straightforward design enables a broader range of healthcare providers to utilize it effectively in emergency situations. Furthermore, while RACE emphasizes motor symptoms, it may overlook critical signs such as expressive aphasia, which can signify LVO. Therefore, although RACE is a valuable tool for LVO detection, ACT-FAST's user-friendly design and consistent performance across studies position it as a promising alternative, especially in prehospital management where rapid decision-making is vital (32).

However, all these tools share the limitation of relying solely on clinical judgment without neuroimaging support, complicating the detection of strokes with atypical presentations, such as posterior circulation infarcts (POCI).

While tools like FAST-ED continue to contribute to stroke triage, ACT-FAST's rapid assessment, high specificity, and consistent performance across studies make it a promising solution for enhancing the prehospital management of LVO strokes. Additionally, while the ROSIER scale has proven effective in emergency settings, it has limitations, particularly in identifying POCI, where distinct symptoms are often missed, leading to overlooked diagnoses in up to 50% of POCI cases. ROSIER's accuracy also diminishes in non-alert or unconscious patients due to its reliance on patient cooperation. Future studies should focus on refining these tools and exploring their integration with emerging technologies, such as portable TCD, which could enhance clinical assessments with non-invasive, real-time imaging capabilities in the field.

5. Limitations

A key limitation of this systematic review is the variability in the quality and design of the included studies. Differences in sample size, methodologies, and outcome measures may affect the generalizability of the results. Furthermore, the current body of evidence on these tools is limited. The small number of studies and reliance on retrospective or small sample data may reduce the robustness of the findings. Future research with larger, more diverse populations and standardized protocols is crucial to validate these results and enhance the generalizability of the conclusions. In addition, all included studies were conducted within a single national prehospital care system, namely the Australian EMS context, with partial overlap in authorship. Therefore, the diagnostic accuracy estimates reported in this review should be interpreted with caution and should not be assumed to be directly generalizable to other EMS systems, countries, or patient populations. Independent external validation studies in diverse prehospital settings are required before broad international implementation of the ACT-FAST tool can be recommended.

6. Conclusions

The ACT-FAST algorithm demonstrates promising utility for the rapid identification of patients likely to benefit from endovascular thrombectomy, supporting timely decision-making in prehospital and clinical settings. Its specificity remains generally high, helping to minimize unnecessary transfers, while sensitivity is strong for typical large vessel occlusions. However, performance varies across occlusion types, with lower sensitivity observed for posterior circulation strokes and M2 lesions, and subtle differences exist between assessments performed by paramedics and physicians. These findings highlight the importance of considering assessor experience, case mix, and stroke subtype when implementing ACT-FAST. In addition, the current evidence is limited to a small number of studies from a single EMS system. Therefore, Ongoing training, prospective evaluation, and further research in diverse populations and healthcare settings are essential to optimize the algorithm's effectiveness and ensure its safe integration into stroke care pathways.

7. Declarations

7.1. Acknowledgments

Not applicable.

7.2. Authors' contributions

Conception and Design of the study: Arash Sarveazad, Mahmoud Yousefifard

Systematic search: Mobina Yarahmadi, Mohammadhossein Vazirizadeh-Mahabadi

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Data extraction: Mobina Yarahmadi, Mohammadhossein

Vazirizadeh-Mahabadi
Interpretation: All authors
Drafting: Mobina Yarahmadi, Mohammadhossein Vazirizadeh-Mahabadi
Critically revise: All authors
The manuscript has been read and approved by all the authors and the requirements for authorship have been met. The manuscript represents honest work.

7.3. Funding/Support

This study was not funded or granted.

7.4. Patient or volunteer consent

Not applicable (N/A)

7.5. Availability of data and materials

The datasets analyzed in the current study are not publicly available in the complete form. However, they are provided by the corresponding author on reasonable request.

7.6. Conflict of interest

The authors of the manuscript declare that they have no conflict of interest.

7.7. Using artificial intelligence chatbots

None.

7.8. Ethical approval

This study was conducted after approval of ethics committee, Iran University of Medical Sciences (IUMS).

7.9. Using artificial intelligence chatbots

Not used.

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Table 1: Characteristics of the included studies

Author, year, country	Study design	Age	Male: n (%)	Specialty of Assessor	Standard
Zhao, 2018, Australia(4)	Retrospective	75 (range: 19–100) *	51	Paramedics	CTA
	Prospective	69 (Range: 21-93)	49.1	Paramedics & physicians	CTA
Zhao, 2021, Australia(25)	Prospective	72.3±15.6	50.2	Paramedics	CT, CTP
Ostman, 2022, Australia(20)	Prospective	69 (Range: 60–81) *	58.7	Member of the stroke team	NCCT, CTA, CTP
Tan, 2022, Australia(26)	Retrospective	80 (IQR: 71–86) *	50	Acute stroke nurse	CTA

*Median. NCCT: non-contrast computed tomography; CTA: computed tomography angiography;
CTP: computed tomography perfusion scan; CT: computed tomography.

Table 2: Diagnostic Performance of the ACT-FAST Tool

Author, year	Design	Type of Stroke	Accuracy	Sensitivity	Specificity	PPV	NPV	AUC
Zhao, 2018 (4)	Retrospective	LVO						
		Overall (n=565)	92.4	85.1	93.1	52.6	98.6	0.90
		Excluding ICH (n=506)	93.9	85.1	96.1	69.0	98.4	0.92
	Prospective	LVO						
		Overall (n=104)	89.0	100	87.2	56.0	100	0.94
		Excluding ICH (n=93)	94.4	100	93.3	73.7	100	0.97
	Prospective	LVO accepted for EVT (n=60)						
		Anterior LVO (AHA class 1)1 (n=14)	91.7	85.7	93.5	80.0	95.6	-
		Anterior LVO (AHA class 1)1 and basilar artery occlusion (n=16)	88.3	75.0	93.2	80.0	91.1	-
		All stroke cases(n=21)	90.0	71.4	100	100	86.7	-
Zhao, 2021 (25)	Prospective	Comprehensive center need (LVO/ICH/tumor), 293/517	82.2	70.1	89.5	80.0	83.3	0.798
		LVO (ICA/M1/basilar), 92/517	78.7	82.6	77.9	44.7	95.4	0.802
		ELVO2, 40/517	80.3	75.8	81.8	58.8	90.8	0.788
		EVT, 74/517	76.4	82.4	75.4	35.9	96.3	0.789
Ostman, 2022 (20)	Prospective	Classic LVO, 24/126	-	63	92	-	-	0.77
		ELVO3, 34/126	-	47	92	-	-	0.70
		Proximal M2 and basilar LVO, 10/126	-	7	80	-	-	0.43
Tan, 2022 (26)	Retrospective	Emergent LVO[4]	-	92	97	55.7	92.7	-

[1]Internal carotid artery/M1-middle cerebral artery occlusion with NIHSS ≥6.
[2]Complete or near-occlusion of extracranial or intracranial internal carotid, middle cerebral (M1/proximal-to-mid M2), basilar and proximal posterior (P1) cerebral arteries, cerebral artery dissection, or symptomatic intracranial atherosclerosis.
[3]Classic LVO, plus proximal MCA-M2 segment or basilar occlusions.
[4] ICA, M1, M2, basilar artery occlusion.
*Median. LVO: large vessel occlusion; ICH: intracranial hemorrhage; ICA: internal carotid artery; NIHSS: National Institutes of Health Stroke Scale; AHA: American Heart Association; EVT: endovascular thrombectomy; IQR: inter quartile range; ELVO: Extended LVO; PPV: Positive Predictive Value; NPV: Negative Predictive Value; AUC: Area Under the Curve

Table 3: Risk of bias assessment of the included studies

Author, year	Risk of bias				Applicability			Overall
	Patient selection	Index test	Reference standard	Flow and timing	Patient selection	Index test	Reference standard	
Zhao, 2018(4)	Unclear	Low	Low	Low	Low	Low	Low	Some concern
Zhao, 2021(25)	Unclear	Low	Low	Unclear	Low	Low	Low	Some concern
Ostman, 2022(20)	Unclear	Low	Low	Unclear	Low	Low	Low	Some concern
Tan, 2022(26)	Unclear	Low	Low	Unclear	Low	Low	Low	Some concern

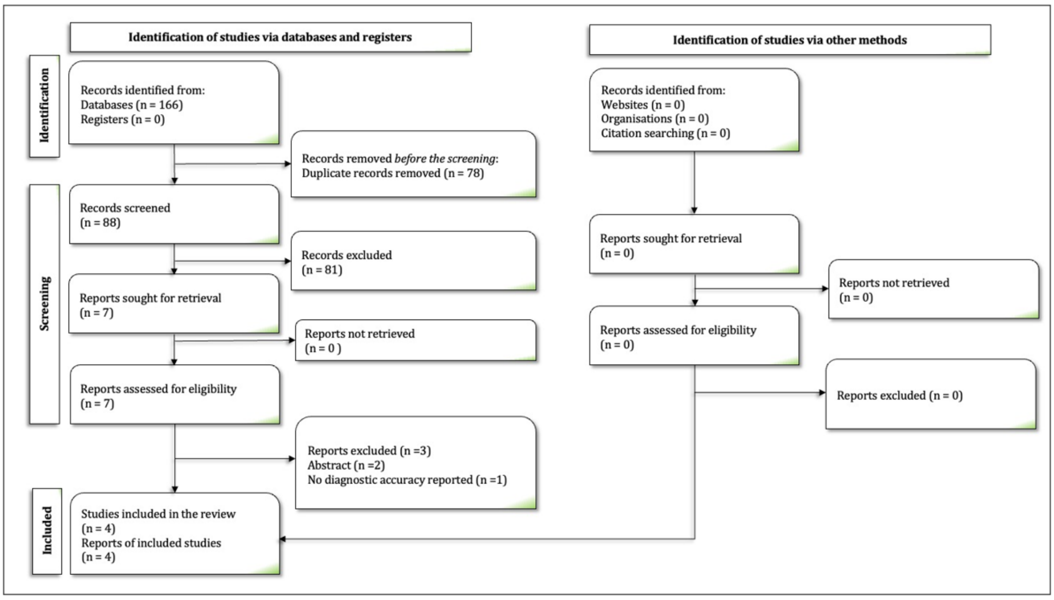

Figure 1: PRISMA-based flow diagram depicting the study selection process in the current review.