CLINICAL CHARACTERISTICS AND OUTCOMES OF LATIN AMERICAN PATIENTS WITH ACUTE ISCHEMIC STROKE AND LARGE VESSEL OCCLUSION: A SYSTEMATIC REVIEW AND EXPLORATORY META-ANALYSIS

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Abstract

Background

Large vessel occlusion is a major cause of stroke-related disability and death and often requires access to specialized reperfusion strategies such as mechanical thrombectomy. However, published data from Latin America remain limited and methodologically heterogeneous. This study aimed to summarize the available evidence on the characteristics, management patterns, and clinical outcomes of Latin American cohorts of patients with acute ischemic stroke (AIS) and confirmed or treatment-eligible large vessel occlusion (LVO).

Methods

We systematically searched six databases up to July 2024 for studies conducted in Latin American countries reporting data on adult patients with AIS and confirmed LVO, or cohorts undergoing endovascular treatment for AIS-LVO. Because many studies enrolled AIS-LVO or treatment-selected populations, the primary analytic approach was descriptive synthesis. The main outcomes were 3-month mortality and favorable functional outcome at 3 months, defined as a modified Rankin Scale (mRS) score of 0–2. For outcomes with sufficiently harmonized denominators, exploratory random-effects meta-analyses of proportions were performed.

Results

A total of 16 studies were included, representing 3 countries: Brazil (n = 12), Argentina (n = 2), and Chile (n = 2). Favorable functional outcome at 3 months (mRS 0–2) was reported in 11 studies, corresponding to a crude descriptive proportion of 37.7% (938/2488). Mortality at 3 months was reported in 13 studies, corresponding to a crude descriptive proportion of 19.7% (498/2533). In exploratory random-effects meta-analyses, the pooled proportion of 3-month mortality was 21.0% (95% CI 16.9%–25.7%; I^2 = 73.0%), while the pooled proportion of favorable functional outcome was 37.3% (95% CI 21.6%–56.3%; I^2 = 91.4%). Sensitivity analyses excluding studies with fewer than 20 participants yielded similar mortality estimates but persistent high heterogeneity for favorable functional outcome.

Conclusions

Among published Latin American AIS-LVO cohorts, approximately one in five patients died by 3 months, whereas functional independence was achieved in a smaller and substantially more heterogeneous proportion of patients. These findings should be interpreted cautiously given the variability in study design, patient selection, denominator definitions, and outcome reporting across studies.

Keywords: Large vessel occlusion; Acute ischemic stroke; Mechanical thrombectomy; Endovascular treatment; Latin America.

CARACTERÍSTICAS CLÍNICAS Y RESULTADOS DE PACIENTES LATINOAMERICANOS CON ACCIDENTE CEREBROVASCULAR ISQUÉMICO AGUDO Y OCLUSIÓN DE GRANDES VASOS: UNA REVISIÓN SISTEMÁTICA Y METAANÁLISIS EXPLORATORIO

Resumen

Antecedentes: La oclusión de grandes vasos es una causa importante de discapacidad y muerte relacionadas con el accidente cerebrovascular, y a menudo requiere acceso a estrategias especializadas de reperfusión, como la trombectomía mecánica. Sin embargo, los datos publicados de América Latina siguen siendo limitados y metodológicamente heterogéneos. Este estudio tuvo como objetivo resumir la evidencia disponible sobre las características, los patrones de manejo y los desenlaces clínicos de cohortes latinoamericanas de pacientes con accidente cerebrovascular isquémico agudo (ACV isquémico agudo, AIS por sus siglas en inglés) y oclusión de grandes vasos (LVO por sus siglas en inglés) confirmada o elegible para tratamiento.

Métodos: Se realizó una búsqueda sistemática en seis bases de datos hasta julio de 2024 para identificar estudios realizados en países latinoamericanos que reportaran datos de pacientes adultos con AIS y LVO confirmada, o cohortes sometidas a tratamiento endovascular para AIS-LVO. Debido a que muchos estudios incluyeron poblaciones AIS-LVO o seleccionadas para tratamiento, el enfoque analítico principal fue una síntesis descriptiva. Los principales desenlaces fueron la mortalidad a los 3 meses y el resultado funcional favorable a los 3 meses, definido como una puntuación de 0–2 en la escala modificada de Rankin (mRS). Para los desenlaces con denominadores suficientemente armonizados, se realizaron metaanálisis exploratorios de proporciones con efectos aleatorios.

Resultados: Se incluyeron un total de 16 estudios, correspondientes a 3 países: Brasil (n = 12), Argentina (n = 2) y Chile (n = 2). El resultado funcional favorable a los 3 meses (mRS 0–2) fue reportado en 11 estudios, lo que correspondió a una proporción descriptiva bruta de 37,7% (938/2488). La mortalidad a los 3 meses fue reportada en 13 estudios, con una proporción descriptiva bruta de 19,7% (498/2533). En los metaanálisis exploratorios de efectos aleatorios, la proporción combinada de mortalidad a 3 meses fue de 21,0% (IC 95%: 16,9%–25,7%; I^2 = 73,0%), mientras que la proporción combinada de resultado funcional favorable fue de 37,3% (IC 95%: 21,6%–56,3%; I^2 = 91,4%). Los análisis de sensibilidad excluyendo estudios con menos de 20 participantes mostraron estimaciones de mortalidad similares, pero persistió una alta heterogeneidad para el resultado funcional favorable.

Conclusiones: Entre las cohortes latinoamericanas publicadas de AIS-LVO, aproximadamente uno de cada cinco pacientes falleció a los 3 meses, mientras que la independencia funcional se alcanzó en una proporción menor y considerablemente más heterogénea de pacientes. Estos hallazgos deben interpretarse con cautela debido a la variabilidad en el diseño de los estudios, la selección de pacientes, las definiciones de los denominadores y el reporte de desenlaces entre los distintos estudios.

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Palabras clave: Oclusión de grandes vasos; Accidente cerebrovascular isquémico agudo; Trombectomía mecánica; Tratamiento endovascular; América Latina.

INTRODUCTION

In Latin America, cerebrovascular disease is one of the leading causes of morbidity and mortality, and ranks among the top causes of premature death and years of healthy life lost due to disability (YLD) [1,2].

Healthcare systems in this region face limited access to acute stroke treatments, particularly for large vessel occlusion (LVO), where the most effective medical therapy is mechanical thrombectomy [3,4].

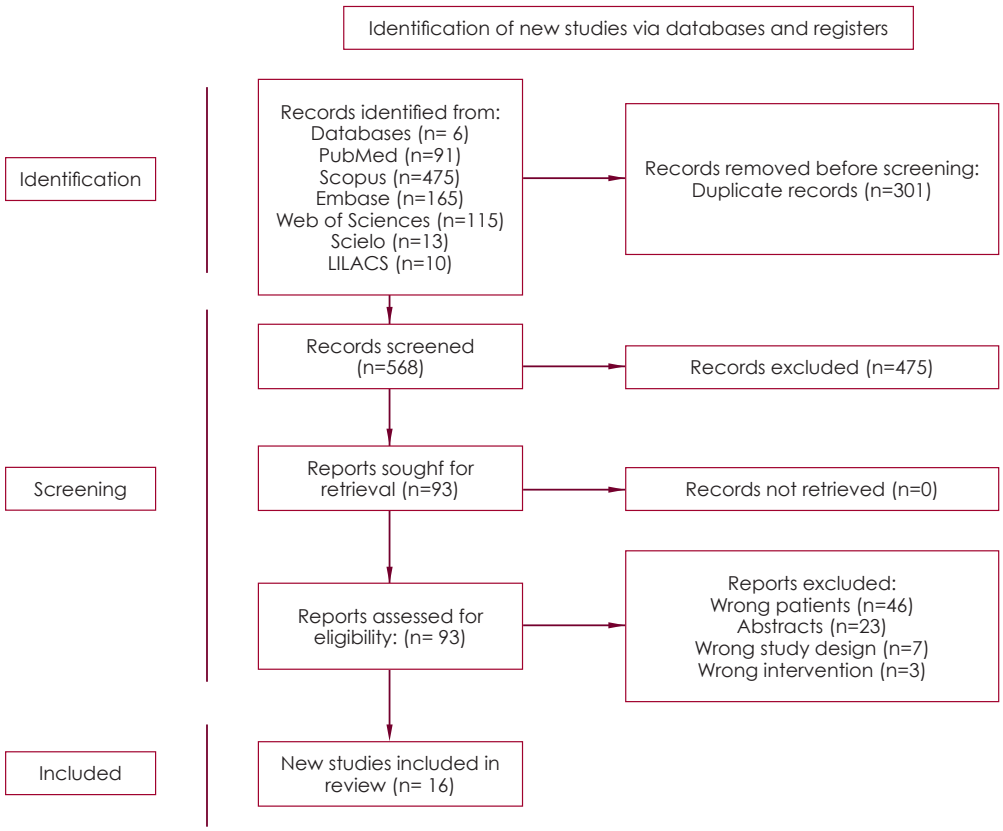


Figure 1. PRISMA flow diagram of study selection

The revised review focuses on Latin American cohorts of patients with AIS and confirmed or treatment-eligible LVO and does not estimate the prevalence of LVO among all AIS patients. PRISMA, Preferred Reporting Items for Systematic Reviews and Meta-Analyses; AIS, acute ischemic stroke; LVO, large vessel occlusion.

Mechanical thrombectomy is a safe and effective treatment option for acute ischemic stroke (AIS) caused by large vessel occlusions, especially when performed within six hours of symptom onset [5,6]. However, there are few studies conducted in the Latin American population regarding the efficacy and feasibility of this treatment. Actually, there is growing research interest in extending the treatment window, particularly in Brazil, where its application beyond six hours has been evaluated [7,8].

This study aimed to summarize the available evidence on the characteristics, management patterns, and clinical outcomes of Latin American cohorts of patients with AIS and confirmed or treatment-eligible LVO.

METHODS

This systematic review was conducted in accordance with PRISMA recommendations and was registered in PROSPERO (ID: CRD420261361061).

We searched six electronic databases up to July 2024 and included studies performed in Latin American countries that reported data on adult patients with AIS and confirmed LVO, or cohorts undergoing endovascular treatment for AIS-LVO. Observational studies, registries, cohort studies, and randomized trials were eligible if they provided extractable outcome data. Reviews, editorials, case reports, conference abstracts without full text, and studies without sufficient outcome data were excluded. Titles, abstracts, and full texts were screened independently by two reviewers, and disagreements were resolved by consensus.

Data extraction focused on study characteristics, country, design, sample size, denominator definitions, and clinical outcomes. Because numerator and denominator definitions varied across reports, the primary analytic strategy was a descriptive synthesis. The main outcomes of interest were 3-month mortality and favorable functional outcome at 3 months, defined as a modified Rankin Scale (mRS) score of 0–2. Outcomes were summarized descriptively using crude proportions across studies reporting at each endpoint.

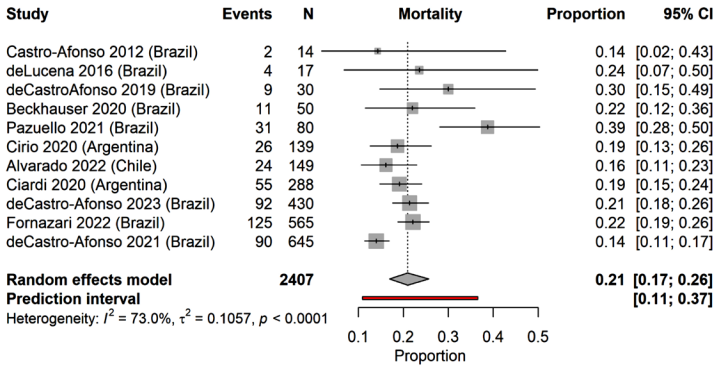
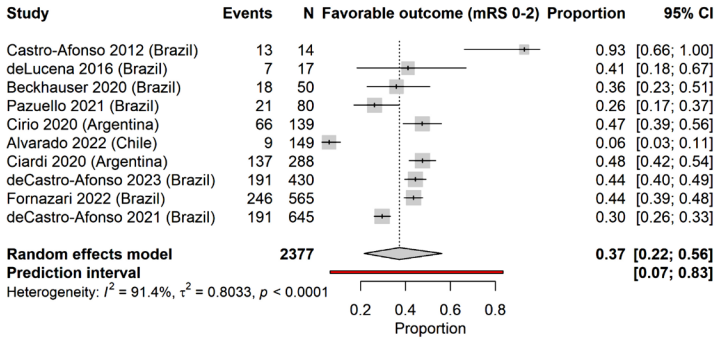


Figure 2: Exploratory random-effects meta-analysis of 3-month mortality in Latin American AIS-LVO cohorts.

Exploratory random-effects meta-analysis of the proportion of 3-month mortality in Latin American AIS-LVO cohorts with sufficiently harmonized denominators. Eleven studies including 2407 patients and 469 deaths were pooled. The estimated pooled mortality proportion was 21.0% (95% CI 16.9%–25.7%), with substantial between-study heterogeneity (I^2 = 73.0%; τ^2 = 0.1057) and a prediction interval of 10.9%–36.6%.
Fuente: Imágenes proporcionadas por los autores.



Supplementary Figure S1: Exploratory random-effects meta-analysis of favorable functional outcome (mRS 0–2) at 3 months

Exploratory random-effects meta-analysis of the proportion of favorable functional outcome (mRS 0–2) at 3 months in Latin American AIS-LVO cohorts with sufficiently harmonized denominators. Ten studies including 2377 patients and 899 favorable outcomes were pooled. The estimated pooled proportion was 37.3% (95% CI 21.6%–56.3%), with very high heterogeneity (I^2 = 91.4%; τ^2 = 0.8033) and a prediction interval of 6.6%–83.5%.
Fuente: Imágenes proporcionadas por los autores.

For outcomes with sufficiently harmonized denominators and clearly defined 3-month follow-up, we additionally performed exploratory meta-analyses of proportions using random-effects models. Individual-study confidence intervals were calculated using the Clopper–Pearson method. Pooled estimates were generated after logit transformation using the inverse-variance method, with between-study variance estimated by restricted maximum likelihood (REML) and Hartung–Knapp adjustment for the random-effects model. Statistical heterogeneity was assessed using the I^2 statistic and τ^2, and prediction intervals were reported to reflect expected dispersion across settings. Sensitivity analyses excluded studies with fewer than 20 participants. All analyses were performed in R.

RESULTS

Study selection

The literature search identified 869 records across six databases. After removal of 301 duplicates, 568 records were screened by title and abstract. Ninety-three full-text reports were assessed for eligibility, and 77 were excluded because of wrong patient population (n = 46), abstract-only publication (n = 23), wrong study design (n = 7), or wrong intervention (n = 3). Ultimately, 16 studies met the revised eligibility criteria and were included in the final review [**Figure 1**].

Study characteristics

The 16 included studies represented 3 Latin American countries: Brazil (n = 12), Argentina (n = 2), and Chile (n = 2). Overall, the included literature was composed predominantly of observational cohorts and registries, with only 2 randomized controlled trials. Across studies, reported mean age ranged from 61.0 to 69.2 years, and approximately 52.6% of participants were male. Most studies evaluated patients with AIS and confirmed LVO who underwent endovascular treatment, especially mechanical thrombectomy, while reported outcomes commonly included mortality, functional status at 90 days, reperfusion metrics, and symptomatic intracranial hemorrhage [**Table 1**].

Because several included studies enrolled AIS-LVO or EVT cohorts rather than unselected AIS populations, revised analysis was designed as a descriptive synthesis of AIS-LVO cohorts and no pooled estimate of LVO prevalence among all AIS patients was generated.

Methodological appraisal

Overall, the included studies were judged to have low-to-moderate methodological concerns. The main limitations were non-population-based patient selection, retrospective single-center designs, incomplete harmonization of denominators across outcomes, and limited control of confounding in several observational studies. Concerns were generally lower in larger registries and randomized studies, whereas smaller retrospective cohorts more often showed moderate concerns. These issues were considered when interpreting both the descriptive synthesis and the exploratory pooled estimates [**Table 3**].

Table 1. Characteristics of included Latin American AIS-LVO cohorts

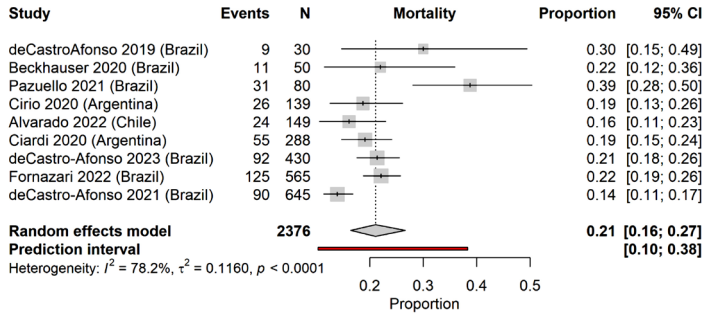
Study	Country	Design	Mean age (years)	Male (%)	Cohort / intervention	Main reported outcomes
Silva, 2024 [9]	Brazil	Randomized controlled trial	64.6 ± 15.8	53.2	Intravenous thrombolysis before mechanical thrombectomy	mRS at 90 days
de Castro-Afonso, 2023 [10]	Brazil	Retrospective cohort	65.95 ± 14.65	55.4	Mechanical thrombectomy	eTICI, sICH, mRS, mortality at 3 months
Alvarado, 2022 [11]	Chile	Retrospective cohort	61.0 ± 14.59	54.4	Mechanical thrombectomy	NIHSS, TICI, mRS at 90 days, mortality
Fornazari, 2022 [12]	Brazil	Retrospective analysis	66.9 ± 15.3	53.0	Mechanical thrombectomy	TICI, mRS, sICH, mortality at 3 months
Del Guerra, 2022 [13]	Brazil	Retrospective cohort	68.4 ± 2.1	64.2	Basilar artery occlusion cohort	Mortality
Pazuello, 2021 [14]	Brazil	Retrospective registry	67.0 ± 12.8	70.0	Thrombectomy for posterior circulation stroke	mRS, sICH, mortality at 3 months
de Castro-Afonso, 2021 [15]	Brazil	Retrospective analysis	67.1 ± 14.9	55.0	Mechanical thrombectomy	eTICI, mRS
Martins, 2020 [16]	Brazil	Randomized controlled trial	65.0	54.1	Standard care plus mechanical thrombectomy vs standard care alone	mRS at 90 days
Ciardi, 2020 [17]	Argentina	Prospective registry	68.75 ± 14.87	48.6	Mechanical thrombectomy	mRS at 90 days, mortality
Beckhauser, 2020 [8]	Brazil	Retrospective cohort	65.6 ± 16.1	55.6	Mechanical thrombectomy	mRS and mortality at 90 days, sICH
Cirio, 2020 [18]	Argentina	Ambispective analysis	67.5 ± 15.0	48.2	Endovascular treatment	mRS, mortality
de Castro-Afonso, 2019 [19]	Brazil	Prospective cohort	69.2	55.0	Thrombectomy	eTICI, mortality
Reyes, 2018 [20]	Chile	Retrospective analysis	61.1 ± 15.8	53.8	Endovascular treatment	NIHSS, TICI, mRS, sICH, mortality
de Castro-Afonso, 2017 [21]	Brazil	Prospective cohort	66.1 ± 13.0	60.0	Direct aspiration first-pass technique	mTICI, mRS, mortality
de Lucena, 2016 [22]	Brazil	Retrospective cohort	67.1 ± 11.4	70.0	Carotid angioplasty with stenting in the EVT setting	TICI, sICH, mortality, mRS
de Castro-Afonso, 2012 [23]	Brazil	Prospective cohort	65.0	61.9	Mechanical thrombectomy	NIHSS, mRS, mortality

AIS-LVO, acute ischemic stroke with large vessel occlusion; eTICI, expanded Thrombolysis in Cerebral Infarction; EVT, endovascular treatment; mRS, modified Rankin Scale; NIHSS, National Institutes of Health Stroke Scale; sICH, symptomatic intracranial hemorrhage; TICI, Thrombolysis in Cerebral Infarction. Studies were conducted in Brazil (n = 12), Argentina (n = 2), and Chile (n = 2). Only 2 randomized controlled trials were included. This revised review summarizes AIS-LVO cohorts and does not estimate the prevalence of LVO among all AIS patients.

Table 2. Summary of primary 3-month outcomes in Latin American AIS-LVO cohorts

Outcome	Studies reporting, n	Crude events / total N	Crude proportion	Exploratory meta-analysis, k	Pooled proportion (random-effects)	95% CI	I^2	Prediction interval	Sensitivity analysis (excluding studies with n < 20)
Mortality at 3 months	13	498 / 2533	19.7%	11	21.0%	16.9%–25.7%	73.0%	10.9%–36.6%	21.1% (95% CI 16.4%–26.7%; I^2 = 78.2%; k = 9)
Favorable functional outcome at 3 months (mRS 0–2)	11	938 / 2488	37.7%	10	37.3%	21.6%–56.3%	91.4%	6.6%–83.5%	33.1% (95% CI 19.6%–50.3%; I^2 = 92.8%; k = 8)

Crude proportions were calculated across studies reporting each endpoint and are presented as a descriptive synthesis. Exploratory pooled proportions were estimated with random-effects meta-analysis only in studies with sufficiently harmonized 3-month denominators. Because reporting definitions, case-mix, and treatment selection varied across studies, pooled estimates should be interpreted cautiously, particularly for favorable functional outcome, which showed very high heterogeneity. mRS, modified Rankin Scale.



Supplementary Figure S2 : Sensitivity analysis of 3-month mortality after exclusion of studies with fewer than 20 participants

Sensitivity analysis of the exploratory random-effects meta-analysis of 3-month mortality after excluding studies with fewer than 20 participants. Nine studies including 2376 patients and 463 deaths were pooled. The pooled mortality proportion was 21.1% (95% CI 16.4%–26.7%), with I^2 = 78.2% and a prediction interval of 10.3%–38.3%.
Fuente: Imágenes proporcionadas por los autores.

Descriptive synthesis of primary 3-month outcomes

Three-month outcomes were reported inconsistently across studies. Favorable functional outcome at 3 months, defined as mRS 0–2, was reported in 11 studies, corresponding to a crude descriptive proportion of 37.7% (938/2488) across studies with available data. Mortality at 3 months was reported in 13 studies, corresponding to a crude descriptive proportion of 19.7% (498/2533). These descriptive estimates were prioritized as the main synthesis because outcome definitions, denominator structure, case-mix, and treatment selection varied substantially across reports [**Table 2**].

Exploratory meta-analysis of 3-month mortality

An exploratory random-effects meta-analysis was performed for 3-month mortality in studies with sufficiently harmonized denominators. This analysis included 11 studies, comprising 2407 patients and 469 deaths. The pooled proportion of mortality at 3 months was 21.0% (95% CI 16.9%–25.7%). Between-study heterogeneity was substantial (I^2 = 73.0%, τ^2 = 0.1057), and the prediction interval ranged from 10.9% to 36.6% [**Figure 2**].

In the sensitivity analysis excluding studies with fewer than 20 participants, 9 studies including 2376 patients and 463 deaths were pooled. The pooled mortality estimate remained very similar at 21.1% (95% CI 16.4%–26.7%), with I^2 = 78.2% and a prediction interval of 10.3%–38.3% [**Supplementary Figure S2**]. This suggests that the main mortality estimate was reasonably robust to exclusion of the smallest studies.

Exploratory meta-analysis of favorable functional outcome

For favorable functional outcome at 3 months (mRS 0–2), the exploratory random-effects meta-analysis included 10 studies, with 2377 patients and 899 favorable outcomes. The pooled proportion of favorable outcome was 37.3% (95% CI 21.6%–56.3%). However, heterogeneity was very high (I^2 = 91.4%, τ^2 = 0.8033), and the prediction interval was very wide (6.6%–83.5%), indicating substantial between-study variability [**Supplementary Figure S1**].

A sensitivity analysis excluding studies with fewer than 20 participants included 8 studies, with 2346

Table 3. Harmonized methodological appraisal of included studies

Study	Design	Selection / representativeness	AIS-LVO / treatment ascertainment	Outcome measurement	Follow-up / completeness	Confounding / comparability	Overall concerns
Silva, 2024 [9]	Randomized controlled trial	Low	Low	Low	Low	Moderate	Moderate
de Castro-Afonso, 2023 [10]	Retrospective cohort	Low	Low	Low	Low	Low	Low
Alvarado, 2022 [11]	Retrospective cohort	Moderate	Low	Low	Low	Moderate	Moderate
Fornazari, 2022 [12]	Retrospective analysis	Low	Low	Low	Low	Low	Low
Del Guerra, 2022 [13]	Retrospective cohort	Moderate	Low	Low	Moderate	Moderate	Moderate
Pazuello, 2021 [14]	Retrospective registry	Low	Low	Low	Low	Low	Low
de Castro-Afonso, 2021 [15]	Retrospective analysis	Low	Low	Low	Low	Low	Low
Martins, 2020 [16]	Randomized controlled trial	Low	Low	Low	Low	Low	Low
Ciardi, 2020 [17]	Prospective registry	Low	Low	Low	Low	Low	Low
Beckhauser, 2020 [8]	Retrospective cohort	Low	Low	Low	Low	Low	Low
Cirio, 2020 [18]	Ambispective analysis	Moderate	Low	Low	Moderate	Moderate	Moderate
de Castro-Afonso, 2019 [19]	Prospective cohort	Moderate	Low	Low	Low	Moderate	Moderate
Reyes, 2018 [20]	Retrospective analysis	Moderate	Low	Low	Moderate	Moderate	Moderate
de Castro-Afonso, 2017 [21]	Prospective cohort	Moderate	Low	Low	Low	Moderate	Moderate
de Lucena, 2016 [22]	Retrospective cohort	Moderate	Low	Low	Low	Moderate	Moderate
de Castro-Afonso, 2012 [23]	Prospective cohort	Moderate	Low	Low	Low	Moderate	Moderate

patients and 879 favorable outcomes. The pooled estimate changed only modestly to 33.1% (95% CI 19.6%–50.3%), but heterogeneity remained very high (I^2 = 92.8%), with a prediction interval of 6.2%–78.7% [**Supplementary Figure S3**]. These findings indicate that pooled estimates for functional independence should be interpreted with considerable caution and should not be considered a stable regional benchmark.

Other reported outcomes

Other outcomes, including TICI/eTICI/mTICI reperfusion metrics, symptomatic intracranial hemorrhage, and NIHSS values, were reported heterogeneously across studies and often using non-comparable denominators or subgroup-specific formats. For this reason, these outcomes were summarized narratively rather than pooled quantitatively. Reported reperfusion outcomes were generally high in EVT cohorts, whereas sICH and neurological severity outcomes varied widely across studies [**Table 2**].

Overall interpretation of the revised results

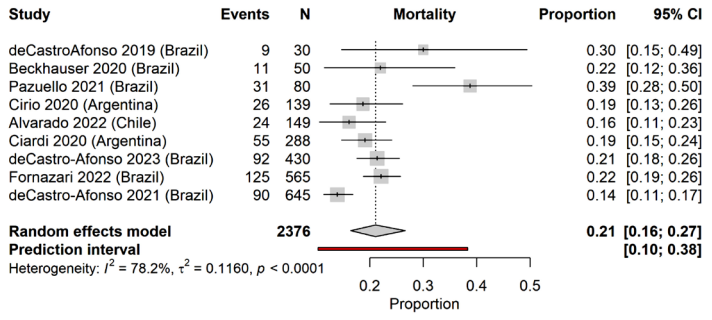
Taken together, the revised analysis suggests that, among published Latin American AIS-LVO cohorts, approximately one in five patients died by 3 months, while functional independence was achieved in a smaller and far more heterogeneous proportion of patients. Given the variability

Supplementary materials - Supplementary Table S1. Study-level data used for descriptive synthesis and exploratory meta-analyses of 3-month outcomes

Study	Mortality events / N	Favorable outcome (mRS 0–2) events / N	Included in mortality meta	Included in mRS meta	Notes
de Castro-Afonso, 2012 [23]	2 / 14	13 / 14	Yes	Yes	Excluded only in sensitivity analyses (n < 20)
de Lucena, 2016 [22]	4 / 17	7 / 17	Yes	Yes	Excluded only in sensitivity analyses (n < 20)
de Castro-Afonso, 2019 [19]	9 / 30	—	Yes	No	Mortality only
Beckhauser, 2020 [8]	11 / 50	18 / 50	Yes	Yes	—
Pazuello, 2021 [14]	31 / 80	21 / 80	Yes	Yes	—
Cirio, 2020 [18]	26 / 139	66 / 139	Yes	Yes	—
Alvarado, 2022 [11]	24 / 149	9 / 149	Yes	Yes	—
Ciardi, 2020 [17]	55 / 288	137 / 288	Yes	Yes	—
de Castro-Afonso, 2023 [10]	92 / 430	191 / 430	Yes	Yes	Harmonized 3-month denominators used
Fornazari, 2022 [12]	125 / 565	246 / 565	Yes	Yes	—
de Castro-Afonso, 2021 [15]	90 / 645	191 / 645	Yes	Yes	—

This table includes only the studies with extractable study-level event counts and denominators used in the exploratory pooled analyses shown in Figure 2 and Supplementary Figures S1–S3. Additional studies contributed to the descriptive synthesis but were not included in pooled analyses when denominators were not sufficiently harmonized.

in study design, patient selection, denominator definitions, and outcome reporting, these findings should be interpreted cautiously and are best understood as a synthesis of published AIS-LVO cohorts rather than as a precise regional benchmark.



Supplementary Figure S3: Sensitivity analysis of favorable functional outcome (mRS 0–2) at 3 months after exclusion of studies with fewer than 20 participants

Sensitivity analysis of the exploratory random-effects meta-analysis of favorable functional outcome (mRS 0–2) at 3 months after excluding studies with fewer than 20 participants. Eight studies including 2346 patients and 879 favorable outcomes were pooled. The pooled proportion was 33.1% (95% CI 19.6%–50.3%), with very high heterogeneity (I^2 = 92.8%) and a prediction interval of 6.2%–78.7%.
Fuente: Imágenes proporcionadas por los autores.

DISCUSSION

This revised systematic review synthesized published Latin American cohorts of patients with acute ischemic stroke (AIS) and confirmed or treatment-eligible large vessel occlusion (LVO), rather than attempting to estimate the prevalence of LVO among all patients with AIS. This distinction is fundamental because much of the available literature derives from treatment-selected or AIS-LVO-enriched cohorts, making a regional epidemiologic prevalence estimate methodologically inappropriate. By reframing the review around the characteristics and outcomes of published AIS-LVO cohorts, the present analysis more accurately reflects what the current evidence can support [3,4,25].

The main findings of the revised analysis are clinically relevant. Across studies reporting 3-month outcomes, crude descriptive synthesis suggested that approximately one in five patients died by 3 months and that a smaller proportion achieved functional independence. In exploratory pooled analyses restricted to studies with sufficiently harmonized denominators, the estimated proportion of 3-month mortality remained close to 21.0%, and this estimate was relatively stable

in sensitivity analysis after exclusion of the smallest studies. By contrast, the pooled estimate for favorable functional outcome (mRS 0–2) was markedly heterogeneous and remained highly variable even after sensitivity analysis. Taken together, these results suggest that mortality may be the more interpretable pooled endpoint in the current Latin American AIS-LVO literature, whereas functional independence is more strongly affected by differences in case-mix, workflow, treatment selection, and follow-up definitions across studies [8,10-23].

This difference between mortality and functional outcome is important. Mortality is generally a more objective endpoint and may therefore be less sensitive to subtle differences in how outcomes are assessed or reported. By contrast, favorable functional outcome at 90 days is influenced by multiple interacting factors beyond reperfusion success alone, including baseline stroke severity, vascular territory, age, collateral status, onset-to-treatment time, post-acute rehabilitation access, and local thresholds for offering thrombectomy [3-6,24]. In the Latin American setting, these factors likely vary substantially across countries, institutions, and even within centers over time. Therefore, the extreme heterogeneity observed for mRS 0–2 is not merely a statistical inconvenience; it likely reflects real clinical and system-level differences that prevent the pooled estimate from being interpreted as a stable regional benchmark [8,10-23,28].

The composition of the available evidence also helps explain the observed variability. The included literature was dominated by Brazilian studies, while only a small number of reports came from Argentina and Chile. Most studies were observational, many were retrospective, and several were based on single-center or treatment-selected cohorts. This means that the evidence is shaped disproportionately by centers with EVT capability and local experience in mechanical thrombectomy, rather than by population-based stroke surveillance. In practical terms, the current literature likely reflects what happens in specialized referral environments more than what happens across the broader regional stroke population. This limits external validity and makes it difficult to generalize the pooled findings to all patients with AIS-LVO in Latin America [8,10-23,28].

Another key issue is denominator instability. Even when studies reported similar clinical endpoints, the populations underlying those endpoints were not always directly comparable. Some studies focused on anterior circulation stroke, others on posterior circulation or basilar occlusion; some analyzed thrombectomy cohorts exclusively, whereas others included broader treatment pathways; and outcome reporting was sometimes based on subgroup-specific or intervention-specific denominators. This is one of the major reasons the descriptive synthesis was prioritized over pooled estimates in the revised manuscript. The descriptive approach preserves the clinical signal of the literature without imposing a false sense of precision on evidence that remains structurally heterogeneous [10-23].

Despite these limitations, the revised findings still offer important regional insights. First, the literature suggests that AIS-LVO care in Latin America remains concentrated in specialized centers with thrombectomy capability. Second, published outcomes appear to fall within a clinically meaningful range, but are highly variable, especially for functional recovery. Third, the evidence base remains geographically unbalanced and methodologically fragmented. These observations matter because they highlight where the real gaps are: not only in treatment access, but also in data structure, registry quality, and standardized reporting. The region does not merely need more thrombectomy reports; it needs broader multicenter, prospectively collected datasets with harmonized denominator definitions and consistent 90-day outcome reporting [28,30].

From a systems-of-care perspective, the findings support the need to strengthen regional stroke pathways. Earlier recognition, improved prehospital triage, more efficient referral to EVT-capable centers, and more standardized post-stroke rehabilitation pathways are all likely to influence functional outcomes [3,4,28]. The fact that mortality appeared more stable than mRS 0–2 may suggest that survival can be measured across settings with reasonable consistency, but recovery quality remains highly dependent on infrastructure and continuity of care. In this sense, heterogeneity in functional outcome may be interpreted not only as statistical dispersion, but also as a signal of broader variability in stroke systems of care across the region [28,29].

This review has several limitations. First, the available evidence was dominated by observational and treatment-selected cohorts rather than unselected stroke populations. Second, denominator definitions and follow-up reporting were not fully harmonized across studies. Third, the exploratory pooled analysis of favorable functional outcome showed very high heterogeneity, limiting its interpretability. Fourth, the geographic representation of the literature was narrow, with the majority of evidence originating from Brazil. Accordingly, these findings should be interpreted as a synthesis of published Latin American AIS-LVO cohorts rather than as precise regional epidemiologic estimates [8,10-23,28].

Notwithstanding these limitations, the present review provides a more methodologically coherent summary of the currently available evidence than the original prevalence-based framing. It suggests that, among published Latin American AIS-LVO cohorts, 3-month mortality is substantial and functional independence is achieved in a smaller but highly variable proportion of patients. Future studies should prioritize prospective multicenter registries, transparent denominator definitions, standardized 90-day outcome reporting, and better representation of underreported countries in the region. Only with that level of methodological harmonization will future meta-analyses be able to provide more robust regional benchmarks [28,30].

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