Research Article Volume 01, Issue No. 02. 2025

The Medical Journal of Neurology and Rehabilitation Medicine



Medical Management vs Mechanical Thrombectomy for Mild Strokes

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Article History :

Received date : 2024/07/14
Revised date : 2024/08/12
Accepted date : 2024/09/09
Published date : 2025/01/07

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ABSTRACT

Background: The reviewed literature provides substantial insights into the evolving landscape of stroke management, particularly focusing on the comparison between mechanical thrombectomy (MT) and traditional medical management for mild strokes. **Literature Review:** The meta-analysis by (Zheng et al., 2017) establishes a foundational understanding of the efficacy of endovascular treatments in the context of comorbidities, suggesting that patients with conditions such as hyperlipidemia and atrial fibrillation may still benefit significantly from MT. This assertion is further supported by the findings of (Kürşad Akpınar et al., 2018), which highlight that even patients with low NIHSS scores can experience favorable outcomes with MT, challenging traditional eligibility criteria. The comparative analysis conducted by (Anchalee Churojana et al., 2018) reinforces this perspective by demonstrating that atrial fibrillation does not adversely impact the outcomes of MT, thereby advocating for a broader application of this intervention. Similarly, (Kaesmacher et al., 2018) provides critical insights into the efficacy of direct MT compared to bridging therapy, suggesting that direct approaches may yield comparable or superior outcomes, particularly for patients ineligible for thrombolysis. **Conclusion:** Finally, the synthesis of advancements in MT by (Raha et al., 2023) encapsulates the ongoing evolution in treatment protocols and eligibility criteria, highlighting the expanding scope of patients who can benefit from this intervention. Together, these findings advocate for a paradigm shift in the treatment of acute ischemic strokes, particularly for patients with mild symptoms, emphasizing the need for a more aggressive approach through mechanical thrombectomy to significantly improve patient outcomes.

Keyword: Medical Management, Mechanical Thrombectomy, Mild Strokes

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INTRODUCTION

The landscape of stroke management has evolved significantly over the past decade, particularly regarding the use of mechanical thrombectomy (MT) versus traditional medical management for acute ischemic strokes, especially in mild cases. The articles reviewed herein provide a comprehensive examination of the efficacy and outcomes associated with mechanical thrombectomy in various patient populations and clinical scenarios.

The meta-analysis conducted by (Zheng et al., 2017) sets the stage for understanding the impact of comorbidities such as hyperlipidemia and atrial fibrillation (AF) on the outcomes of endovascular treatments. This analysis highlights the importance of evaluating the functional outcomes and mortality rates in patients receiving endovascular treatment compared to those receiving standard medical care, thereby establishing a foundational understanding of the efficacy of mechanical interventions in acute ischemic stroke.

Building on this foundation, (Kürşad Akpınar et al., 2018) delve into the specific population of minor stroke patients with large vessel occlusion, underscoring the potential benefits of MT in cases previously considered too mild for such interventions. Their findings suggest that even patients with low National Institutes of Health Stroke Scale (NIHSS) scores can achieve favorable outcomes with mechanical thrombectomy, challenging the traditional boundaries of treatment eligibility.

Further exploring the nuances of patient selection, (Anchalee Churojana et al., 2018) investigate outcomes in patients with and without atrial fibrillation undergoing mechanical thrombectomy. Their results indicate that AF does not adversely affect the outcomes of MT, suggesting that patients with this comorbidity may still benefit from aggressive intervention strategies.

The comparative analysis by (Kaesmacher et al., 2018) provides critical insights into the advantages of direct mechanical thrombectomy over bridging therapy with

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intravenous thrombolysis. Their findings contribute to the ongoing debate about the optimal approach for treating acute ischemic strokes, particularly in patients who may be ineligible for thrombolysis.

(Harrichandparsad, 2019) highlights the procedural challenges and complications associated with mechanical thrombectomy, emphasizing the need for high-volume centers and trained personnel to minimize risks. This article raises important considerations regarding the implementation of MT protocols, especially for patients presenting with mild symptoms.

(Li et al., 2022) further affirm the efficacy of mechanical thrombectomy by demonstrating its significant impact on recanalization rates and disability outcomes. Their research underscores the need for continuous improvement in treatment protocols to enhance patient prognosis in acute ischemic stroke cases.

(Hossein Aghamiri et al., 2022) build on this evidence by comparing the clinical outcomes of patients undergoing mechanical thrombectomy against those receiving only medical management. Their findings reveal a marked difference in recovery trajectories, reinforcing the superiority of mechanical intervention in improving functional outcomes.

Finally, (Raha et al., 2023) synthesize advancements in mechanical thrombectomy, reaffirming its established efficacy over intravenous thrombolysis for large vessel occlusions. This article discusses the evolving criteria for treatment eligibility and the implications of recent trials that have broadened the scope of patients who can benefit from this intervention, thus highlighting the ongoing progression in the field of stroke management.

Together, these articles illustrate a paradigm shift in the treatment of acute ischemic strokes, particularly for patients with mild symptoms, advocating for a more aggressive approach through mechanical thrombectomy as a means to improve patient outcomes significantly.

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The article titled "Impact of hyperlipidemia and atrial fibrillation on the efficacy of endovascular treatment for acute ischemic stroke: a meta-analysis" by (Zheng et al., 2017) presents a comprehensive examination of the effectiveness of endovascular treatment (EVT) modalities, specifically mechanical thrombectomy, in the context of acute ischemic stroke (AIS). The authors adhere to the PRISMA guidelines, ensuring a systematic approach to their literature review and meta-analysis, which enhances the credibility and replicability of their findings.

The systematic review included randomized controlled trials (RCTs) that compared EVT, which encompasses mechanical thrombectomy and thrombolysis, with standard medical management. The inclusion criteria were well-defined, focusing on studies that reported outcomes such as the modified Rankin Scale (mRS) and mortality rates at 90 days post-treatment. The rigorous exclusion criteria, which eliminated studies with fewer than 20 participants or follow-up periods shorter than 90 days, further strengthens the reliability of the results presented.

The primary outcome of the study was the rate of favorable functional outcomes (mRS 0–2) at 90 days, which is a critical measure when evaluating the efficacy of interventions for stroke patients. Secondary outcomes, including recanalization rates, mortality rates, and the incidence of symptomatic intracerebral hemorrhage (sICH), provide a broader perspective on the safety and effectiveness of mechanical thrombectomy versus standard medical care. The use of odds ratios and confidence intervals allows for a nuanced understanding of the treatment effects, while the application of a random effects model addresses potential heterogeneity among the included studies.

One notable aspect of the article is the assessment of bias using the Cochrane Collaboration risk of bias tool. This methodological rigor is essential for interpreting the validity of the included studies and their findings. However, the article could benefit from a more detailed discussion of the implications of the identified biases on the overall conclusions drawn from the meta-analysis.

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The findings suggest that EVT, particularly mechanical thrombectomy, may offer significant advantages over standard medical management for certain patient populations with AIS, especially those with specific comorbidities such as hyperlipidemia and atrial fibrillation. This insight is crucial for clinicians when considering treatment options for mild strokes, as it underscores the importance of individualized patient assessment in determining the most effective management strategy.

The article "Mechanical Thrombectomy for Minor Stroke Patients (NIHSS<6) With Large Vessel Occlusion" by (Kürşad Akpınar et al., 2018) presents a comprehensive multicenter cohort study that critically evaluates the efficacy of mechanical thrombectomy in patients with minor strokes characterized by low National Institutes of Health Stroke Scale (NIHSS) scores, specifically those with large vessel occlusions in the anterior circulation. This study emerges in the context of an ongoing debate regarding the optimal management strategies for mild stroke syndromes, particularly concerning the potential benefits of mechanical intervention compared to conservative medical management.

The authors highlight that minor strokes, often presenting with seemingly mild symptoms, can result in significant long-term disability if not appropriately treated. Their findings suggest that patients with right hemisphere ischemia, who may exhibit deceptively mild symptoms, are at a higher risk for poor outcomes when not administered timely thrombolysis ((Kürşad Akpınar et al., 2018)). This observation underscores the critical importance of thorough assessment and timely intervention in this patient demographic.

The systematic review and meta-analysis referenced within the article further bolster the argument for mechanical thrombectomy, demonstrating that endovascular interventions can lead to improved outcomes in patients with large vessel occlusions, even when presenting with mild symptoms ((Kürşad Akpınar et al., 2018)). The authors argue that the conventional approach of relying solely on thrombolysis may inadequately address the needs of these patients, thereby advocating for a more aggressive treatment strategy that includes thrombectomy.

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Moreover, the study elucidates the potential pitfalls associated with misclassifying the severity of stroke symptoms, particularly in cases where patients exhibit rapid improvement. The authors provide compelling evidence that patients who do not receive intravenous tissue plasminogen activator (IV tPA) due to a misinterpretation of their mild symptoms often experience poorer outcomes, emphasizing the need for heightened awareness among clinicians regarding the risks of under-treatment ((Kürşad Akpınar et al., 2018)).

The article titled "A Comparison of Mechanical Thrombectomy for Large Vessel Occlusion in Acute Ischemic Stroke between Patients with and without Atrial Fibrillation" by (Anchalee Churojana et al., 2018) provides a comprehensive analysis of the outcomes associated with mechanical thrombectomy in patients with acute ischemic stroke (AIS), specifically comparing those with atrial fibrillation (AF) to those without. The study's primary focus is to evaluate whether the presence of AF impacts the effectiveness and safety of mechanical thrombectomy in treating large vessel occlusions.

The authors conducted a comparative analysis involving 50 patients with AF and 84 patients without AF. The study meticulously examined various factors such as sex, National Institutes of Health Stroke Scale (NIHSS) scores, the administration of intravenous recombinant tissue plasminogen activator (IV r-TPA) prior to treatment, site of occlusion, intracranial stenosis, operational timing, number of stent passes, incidence of symptomatic hemorrhage, and the management of AF. Notably, the findings indicated that these variables did not yield statistically significant differences between the two groups, suggesting that AF does not correlate with poorer outcomes in AIS patients undergoing mechanical thrombectomy.

One of the critical insights from the study is the affirmation that mechanical thrombectomy is effective for patients with posterior circulation strokes, provided that there is preserved brain stem tissue. The outcomes for these patients were comparable to those with anterior circulation strokes, reinforcing the notion that

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mechanical thrombectomy can be a viable option across different stroke presentations.

The study also highlights that complications and mortality rates were similar between the AF and non-AF groups, indicating that the presence of AF does not adversely affect the safety profile of mechanical thrombectomy in this context. This finding is particularly important as it challenges the preconceived notion that AF may lead to worse outcomes in stroke management.

The article titled "Direct mechanical thrombectomy in tPA-ineligible and -eligible patients versus the bridging approach: a meta-analysis" by (Kaesmacher et al., 2018) provides a comprehensive examination of the efficacy of mechanical thrombectomy as a treatment for ischemic stroke, particularly in the context of patients who are either eligible or ineligible for intravenous thrombolysis (tPA). The main thrust of the article is to compare the outcomes of direct mechanical thrombectomy with those of the bridging approach, which combines intravenous alteplase with mechanical intervention.

The authors conducted a meta-analysis that synthesizes data from multiple studies, including randomized controlled trials and registries, to evaluate the effectiveness of direct thrombectomy in improving patient outcomes. They highlight that while intravenous thrombolysis has been a standard treatment for acute ischemic strokes, its efficacy diminishes in certain patient populations, particularly those with contraindications to tPA. This sets the stage for exploring the role of mechanical thrombectomy as a standalone treatment.

One of the key insights from the article is the demonstration that direct mechanical thrombectomy can yield favorable outcomes comparable to those achieved with the bridging approach. This is significant as it suggests that for patients who are not candidates for tPA, direct thrombectomy can be a viable and effective option. The analysis presents data indicating that direct thrombectomy not only reduces the time to reperfusion but also minimizes the risk of hemorrhagic complications associated with thrombolysis.

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Moreover, the authors meticulously discuss the implications of these findings for clinical practice. They argue for the need to reassess current treatment algorithms to potentially prioritize direct mechanical thrombectomy in selected patient populations. The article emphasizes that while bridging therapy has its merits, the direct approach may streamline treatment protocols and enhance patient outcomes, particularly in acute settings.

However, the article is not without its limitations. The authors acknowledge that the heterogeneity of the included studies could introduce variability in the outcomes reported. Additionally, the analysis may not fully account for the nuances of clinical decision-making in diverse patient populations, which could impact the generalizability of the findings.

The article "Mechanical thrombectomy for acute ischaemic stroke" by (Harrichandparsad, 2019) provides a comprehensive overview of the complications associated with mechanical thrombectomy (MT) and emphasizes the importance of procedural context in ensuring patient safety and efficacy of treatment. The author outlines various device-related complications, such as vessel perforation and symptomatic intracranial hemorrhage, as well as access-related issues like femoral artery dissection and pseudoaneurysm. The reported overall procedural complication rate of approximately 15% aligns with findings from recent randomized controlled trials (RCTs), suggesting that while complications are not uncommon, many do not significantly impact clinical outcomes.

A critical evaluation of the material reveals that the author advocates for the performance of mechanical thrombectomy in high-volume centers, underscoring the need for trained physicians proficient in intracranial endovascular procedures. This perspective is crucial, as it highlights the necessity of a multidisciplinary approach in managing acute ischemic strokes, particularly in comprehensive stroke units. The emphasis on the immediate availability of neuro-critical care and neurosurgical support when complications arise further reinforces the need for a robust infrastructure to handle potential adverse events.

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However, the article points out a notable gap in the current literature regarding the efficacy of mechanical thrombectomy in specific patient populations, such as those with mild stroke symptoms (NIHSS <5) and posterior circulation strokes. This lack of clarity indicates a need for ongoing research to define the role of MT in these contexts, which could significantly influence clinical decision-making. The author correctly suggests that ongoing RCTs may address these unanswered questions in the coming years, highlighting the dynamic nature of stroke management and the importance of evidence-based practice.

The article "Clinical effect and prognostic factors of mechanical thrombectomy in the treatment of acute ischemic stroke" by (Li et al., 2022) provides a comprehensive examination of mechanical thrombectomy as a treatment modality for acute ischemic stroke, a condition associated with significant morbidity and mortality. The authors emphasize the importance of timely intervention, highlighting that approximately 75% of stroke survivors experience varying degrees of disability, which adversely affects their quality of life.

The article outlines the comparative effectiveness of mechanical thrombectomy versus traditional medical management, particularly intravenous thrombolysis. It presents compelling data indicating that mechanical thrombectomy achieves a recanalization rate of 66.0% to 88.0%, significantly higher than that typically observed with conservative treatments ((Li et al., 2022)). This finding underscores the potential of mechanical thrombectomy to directly address the underlying pathology of ischemic strokes by removing occlusive thrombi and restoring blood flow.

Moreover, the authors discuss the critical time factor associated with thrombectomy procedures. They note that while the treatment window can be extended by six to eight hours, any delay in the time from symptom onset to intervention could substantially diminish the benefits of thrombectomy. This is a crucial point, as it emphasizes the need for rapid response protocols in acute stroke management to maximize patient outcomes ((Li et al., 2022)).

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However, the article also acknowledges the variability in clinical benefits among patients undergoing mechanical thrombectomy. This variability suggests that not all patients may derive the same level of benefit from the procedure, which raises important questions about patient selection and individualized treatment strategies. The authors advocate for a comprehensive analysis of prognostic factors to better inform treatment decisions and improve prognostic evaluations.

The article titled "Efficacy of mechanical thrombectomy in stroke patients with large vessel involvement" by (Hossein Aghamiri et al., 2022) provides a critical examination of the efficacy of mechanical thrombectomy compared to medical management in the context of ischemic stroke. The authors emphasize the primary objective in stroke treatment: to prevent secondary injury and manage tissue ischemia effectively. This foundational goal underscores the necessity of evaluating both treatment modalities rigorously.

The study highlights a significant demographic difference, noting that the mean age of patients who qualified for mechanical thrombectomy was notably lower than that of those receiving only medical treatment. This observation raises important considerations regarding the selection criteria for thrombectomy and the potential impact of age on treatment outcomes. The authors reference a prior study by Qureshi et al. (2020), which adds context to their findings and supports the ongoing discourse surrounding the efficacy of endovascular thrombectomy.

A key aspect of the study is the use of the Modified Rankin Scale (MRS) to assess patient outcomes. The results indicate that patients who underwent mechanical thrombectomy experienced a significant decrease in their MRS scores over time, suggesting an improvement in their functional status. In contrast, the cohort receiving only medical treatment exhibited a deterioration in their condition, as evidenced by an increase in their MRS scores. This stark contrast in outcomes underscores the potential superiority of mechanical thrombectomy in managing ischemic strokes, particularly in patients with large vessel involvement.

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However, the authors caveat their findings by acknowledging that the medical treatment group may have had comparatively poorer clinical and general health conditions at baseline. This factor introduces a confounding variable that could influence the results, as it raises questions about the comparability of the two groups. The implications of such disparities must be carefully considered when interpreting the efficacy of mechanical thrombectomy versus medical management.

The article "Advances in mechanical thrombectomy for acute ischaemic stroke" by (Raha et al., 2023) provides a comprehensive overview of the evolution of mechanical thrombectomy as a primary intervention for acute ischaemic stroke, particularly focusing on its superiority over traditional medical management approaches such as intravenous thrombolysis. The authors highlight the significant advancements made since 2015 in both the criteria for patient selection and the technical aspects of the procedure, which have collectively bolstered the treatment's efficacy and accessibility.

One of the central themes of the article is the comparative effectiveness of mechanical thrombectomy versus best medical treatment. The authors reference multiple trials that have established a clear benefit for mechanical thrombectomy, particularly in cases of anterior circulation large vessel occlusion. The results from these studies, including the pivotal HERMES trials, indicate a marked increase in the proportion of patients who achieve favorable functional outcomes—defined as being alive and independent at three months post-treatment—when mechanical thrombectomy is employed ((Raha et al., 2023)). This finding underscores the critical role that thrombectomy plays in improving patient prognosis, particularly in the acute phase of stroke management.

Additionally, the article addresses the limitations that have historically restricted access to mechanical thrombectomy. Despite the compelling evidence supporting its use, the authors note that access to this treatment modality remains limited in many healthcare settings. This disparity in access raises important questions about the implementation of stroke care protocols and the need for comprehensive stroke centers equipped to deliver timely thrombectomy services. The authors advocate

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for continued efforts to expand access to this life-saving intervention, emphasizing that timely arterial recanalization is crucial for optimizing outcomes in acute ischaemic stroke patients.

Furthermore, the article provides a critical evaluation of the evolving evidence base supporting mechanical thrombectomy. The authors acknowledge that while the procedure has been performed for over two decades, the initial lack of robust evidence regarding its efficacy and cost-effectiveness hindered its widespread adoption. However, recent advancements in clinical trials and treatment protocols have addressed these gaps, resulting in a more definitive understanding of the benefits of mechanical thrombectomy ((Raha et al., 2023)).

CONCLUSION

The reviewed literature provides substantial insights into the evolving landscape of stroke management, particularly focusing on the comparison between mechanical thrombectomy (MT) and traditional medical management for mild strokes. The articles collectively underscore the potential advantages of MT, particularly for patients previously deemed ineligible due to the perceived mildness of their symptoms.

The meta-analysis by (Zheng et al., 2017) establishes a foundational understanding of the efficacy of endovascular treatments in the context of comorbidities, suggesting that patients with conditions such as hyperlipidemia and atrial fibrillation may still benefit significantly from MT. This assertion is further supported by the findings of (Kürşad Akpınar et al., 2018), which highlight that even patients with low NIHSS scores can experience favorable outcomes with MT, challenging traditional eligibility criteria.

The comparative analysis conducted by (Anchalee Churojana et al., 2018) reinforces this perspective by demonstrating that atrial fibrillation does not adversely impact the outcomes of MT, thereby advocating for a broader application of this intervention. Similarly, (Kaesmacher et al., 2018) provides critical insights into the efficacy of direct MT compared to bridging therapy, suggesting that direct

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approaches may yield comparable or superior outcomes, particularly for patients ineligible for thrombolysis.

Additionally, the procedural challenges and complications associated with MT, highlighted by (Harrichandparsad, 2019), emphasize the necessity for high-volume centers to ensure patient safety and optimal outcomes. Despite these challenges, the evidence presented by (Li et al., 2022) and (Hossein Aghamiri et al., 2022) demonstrates the significant impact of MT on recanalization rates and functional outcomes, reinforcing its superiority over standard medical management.

Finally, the synthesis of advancements in MT by (Raha et al., 2023) encapsulates the ongoing evolution in treatment protocols and eligibility criteria, highlighting the expanding scope of patients who can benefit from this intervention. Together, these findings advocate for a paradigm shift in the treatment of acute ischemic strokes, particularly for patients with mild symptoms, emphasizing the need for a more aggressive approach through mechanical thrombectomy to significantly improve patient outcomes.

DISCLOSURE STATEMENT

- Disclosure Statement : The authors have no conflicts of Interest to declare
- Funding Sources : None
- Acknowledgements : -
- Author Contribution : All authors discussed and contributed the final content for journal submission and publication

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