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Early Versus Delayed NOAC Initiation After AF-Related Stroke: Reconciling Randomized Trials, Registries, and Global Guideline Differences

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ABSTRACT

***Background*:** Atrial fibrillation (AF)–related ischemic stroke remains one of the leading causes of severe neurological disability and recurrent stroke worldwide. The timing of starting oral anticoagulation after such events is a critical yet controversial decision. Starting anticoagulation too early can lead to hemorrhagic transformation, while waiting too long exposes patients to recurrent cardioembolic stroke. Over the past decade, clinical evidence from randomized controlled trials (RCTs) and observational registries has significantly reshaped our understanding of this delicate balance.

Aim: This review summarizes and compares key studies evaluating early versus delayed initiation of non–vitamin K oral anticoagulants (NOACs) following AF-related stroke. It also examines how international guidelines interpret these data differently and offers a simplified, practical framework to guide clinical decisions in routine stroke care. The review emphasizes trial evidence (ELAN, TIMING, SoSTART), registry findings (RAF, RAF-NOAC, CROMIS-2), and contextual factors such as thrombolysis, thrombectomy, and imaging features that modify bleeding risk.

Summary: Recent evidence suggests that early NOAC initiation (typically within 4–7 days for mild-to-moderate infarcts) is safe and may reduce the risk of recurrent ischemia without significantly increasing major bleeding, provided that imaging shows no parenchymal hematoma. Conversely, patients with large infarcts, hemorrhagic transformation, or high microbleed burden benefit from delayed initiation—often beyond 14 days. While most modern guidelines converge toward this risk-adapted approach, regional variability persists due to differing interpretations of evidence and healthcare infrastructure constraints.

Conclusion: Clinical decisions on anticoagulation timing should no longer rely solely on rigid time-based rules. Instead, they should integrate stroke severity, imaging findings, and patient-specific bleeding risk. By combining trial evidence with individualized assessment, clinicians can optimize outcomes—achieving safe and effective prevention of recurrent AF-related stroke while minimizing hemorrhagic complications.

Keywords: Early, Delayed NOAC Initiation ,AF, Stroke

INTRODUCTION

Atrial fibrillation (AF) is one of the most common cardiac arrhythmias and a major cause of cardioembolic ischemic stroke. These strokes tend to be large, disabling, and associated with a high early recurrence rate if anticoagulation is not started promptly. On the other hand, introducing anticoagulation too soon after an acute infarct carries the danger of hemorrhagic transformation, which can worsen outcomes dramatically. Determining the optimal time to restart anticoagulation after a stroke therefore remains one of the most difficult decisions in clinical neurology [1].

For many years, physicians followed empirical guidance such as the "1-3-6-12 day rule," where anticoagulation was started at 1 day after a stroke, 3 days after a mild stroke, 6 days after a moderate stroke, and 12 days after a severe stroke. Although easy to apply, this rule was based largely on expert opinion rather than randomized evidence, and it does not account for patient-specific features such as infarct size, reperfusion therapy, or bleeding risk factors [2].

The emergence of direct oral anticoagulants (DOACs) has prompted a re-examination of these traditional timing strategies. Compared to warfarin, DOACs offer a more predictable anticoagulant effect, faster onset, and lower risk of intracranial hemorrhage, allowing clinicians to consider earlier initiation in selected patients [3]. In the past decade, large randomized controlled trials (ELAN, TIMING, SoSTART) and real-world registries (RAF, RAF-NOAC, CROMIS-2) have provided valuable data on when anticoagulation can safely begin after stroke.

The aim of this review is to summarize the current evidence comparing early versus delayed initiation of oral anticoagulation after AF-related stroke It also seeks to explain why global guidelines differ in their recommendations and to provide a practical, simplified framework for clinicians. The goal is to bridge research findings with daily practice—helping stroke physicians make evidence-based, patient-centered decisions that balance the risk of recurrent embolism against the potential for hemorrhagic complications [4].

Before the advent of modern imaging and direct oral anticoagulants, decisions about when to start anticoagulation after ischemic stroke were largely based on clinical severity and expert consensus rather than strong evidence. The most widely used framework, the **"1-3-6-12 day rule,"** emerged from observational experience in the 1990s and early 2000s. It recommended anticoagulation 1 day after a stroke, 3 days after a small infarct, 6 days after a moderate infarct, and 12 days after a large or severe stroke [5]. The rationale was simple: the larger the infarct, the higher the risk of hemorrhagic transformation if anticoagulation was started too early.

Although intuitive, this rule lacked imaging validation and did not consider individual differences in infarct biology or reperfusion status. Over time, it became clear that some patients could safely begin anticoagulation earlier—particularly those with small infarcts and no hemorrhagic change—while others required longer delays despite a similar clinical score. This realization gave rise to the concept of **risk-adapted timing**, which integrates imaging findings, stroke subtype, and patient comorbidities [6].

The arrival of **non–vitamin K oral anticoagulants (NOACs)** further challenged traditional thinking. Because NOACs (such as apixaban, rivaroxaban, dabigatran, and edoxaban) have a faster onset of action and lower intracranial bleeding risk than warfarin, researchers began exploring whether these agents could be safely introduced earlier in the post-stroke period [7].

By the mid-2010s, observational registries such as **RAF** and **RAF-NOAC** provided early signals that carefully selected patients could benefit from earlier anticoagulation—sometimes within the first week—without an excess of bleeding. These findings paved the way for formal randomized controlled trials designed to test early versus delayed initiation strategies [8].

In short, the evolution of timing heuristics reflects the journey from fixed, empirical schedules toward more flexible, evidence-driven strategies. This transition continues today as clinical trials and imaging-guided approaches refine the balance between preventing recurrence and avoiding hemorrhage [9].

Randomized Trial Evidence

Over the last decade, several large randomized controlled trials have directly examined the safety and effectiveness of early

versus delayed initiation of direct oral anticoagulants (DOACs) following atrial fibrillation–related ischemic stroke. These trials mark a turning point in clinical practice, providing data-driven guidance to replace long-standing expert opinion.

The ELAN trial, published in 2023, is the most influential study to date. It included more than 2,000 patients and compared an early-start strategy (within 48 hours for minor to moderate strokes and day 6–7 for major strokes) against a later-start strategy (day 3–4 for minor to moderate strokes and day 12–14 for major strokes). The results showed that early treatment was not associated with a higher risk of intracranial hemorrhage and was linked to a numerically lower rate of recurrent ischemic stroke. These findings suggested that many patients can safely begin DOAC therapy earlier than previously thought [10].

The TIMING trial, conducted in Sweden, further supported this approach. It randomized patients to start DOACs within four days of the stroke or between days 5 and 10. Early initiation was noninferior for the composite outcome of stroke recurrence, major bleeding, or death. Importantly, no symptomatic intracranial hemorrhages were observed in either group, reinforcing the safety of early use in patients with small or moderate infarcts [11].

Similarly, the SoSTART trial in the United Kingdom compared early versus later anticoagulation (median start times 5 and 12 days, respectively) and found no significant difference in major bleeding or ischemic events. Although underpowered to detect small differences, the direction of effect again favored earlier initiation [12].

When the results of these trials are viewed together, a consistent message emerges: early initiation of DOACs, typically within the first week after a mild or moderate ischemic stroke, is generally safe and may reduce recurrent embolic events. For large infarcts or those with hemorrhagic transformation, a cautious, delayed approach remains appropriate. Thus, modern evidence supports a more flexible, risk-adapted strategy instead of rigid timing rules [13].

Observational Registries and Real-World Data

Before the availability of large randomized trials, much of what guided anticoagulation timing after AF-related stroke came from prospective registries and real-world cohort studies. These registries provided important insights into how early initiation performed in everyday clinical settings, often including patients who would have been excluded from trials due to age, comorbidities, or large infarcts.

One of the most cited studies is the RAF (Early Recurrence and Cerebral Bleeding in Patients With Acute Ischemic Stroke and Atrial Fibrillation) registry. This study enrolled over 1,000 patients and examined outcomes based on the timing of anticoagulation initiation. Results showed that starting oral anticoagulation between days 4 and 14 was associated with the lowest combined risk of recurrent ischemic stroke and intracerebral hemorrhage. Starting within the first three days carried a slightly higher bleeding risk, particularly in those with large infarcts or early hemorrhagic transformation [14].

The follow-up RAF-NOAC registry specifically focused on patients treated with direct oral anticoagulants. It demonstrated that early use of DOACs—usually within the first week—was associated with very low rates of both recurrent stroke and intracranial bleeding. Compared with historical warfarin-treated cohorts, DOACs offered a more favorable safety profile even when started earlier [15].

Another key contribution came from the CROMIS-2 study, which examined the impact of cerebral microbleeds detected by MRI on the risk of subsequent hemorrhage. Patients with multiple microbleeds had a higher risk of intracranial bleeding once anticoagulation began, highlighting that brain imaging should inform timing decisions rather than a one-size-fits-all approach [16].

These registries collectively emphasize that early anticoagulation can be safe in most patients, provided that imaging excludes parenchymal hematoma and infarct size is modest. They also reinforce the need to tailor decisions based on both clinical severity and radiological findings. Real-world data, therefore, complement trial evidence by confirming that flexible, imaging-guided initiation is feasible and effective in routine stroke care [17].

Thrombolysis and Thrombectomy

The increasing use of reperfusion therapies such as intravenous thrombolysis and mechanical thrombectomy has added new layers of complexity to the question of when to start oral anticoagulation after an AF-related stroke. These procedures can both improve outcomes and increase the risk of hemorrhagic transformation, meaning that timing decisions must be even more individualized.

After intravenous thrombolysis, the brain's vascular endothelium remains fragile for at least 24 to 48 hours due to fibrinolytic effects and temporary blood–brain barrier disruption. For this reason, current guidelines recommend repeat brain imaging at 24 hours to rule out hemorrhagic transformation before initiating any anticoagulant therapy. In patients with small infarcts and stable imaging, oral anticoagulation can usually begin safely around day 3 to 4. For moderate or large infarcts, especially those with petechial bleeding or residual perfusion deficits, starting at day 6 to 12 is often safer [18].

Mechanical thrombectomy introduces additional considerations. When recanalization is successful and final infarct size is small, anticoagulation can often start earlier—sometimes as soon as 2 to 4 days post-procedure—if imaging confirms stability. However, if the intervention required multiple device passes, produced large infarct volumes, or led to contrast extravasation or small subarachnoid bleeds, clinicians typically defer anticoagulation for at least 7 to 14 days [19].

Combined therapy with both thrombolysis and thrombectomy carries the highest bleeding risk, particularly in large-vessel occlusions with extensive infarct cores. In these cases, the decision to initiate anticoagulation should be guided by follow-up imaging rather than fixed time intervals. Serial CT or MRI scans help confirm whether hemorrhagic transformation or edema is evolving before therapy begins [20].

Overall, patients undergoing reperfusion therapies benefit most from a cautious, imaging-led approach. Early initiation may be appropriate in minor infarcts with stable imaging, while delayed initiation remains essential when vascular integrity has been compromised. This pragmatic, individualized strategy balances the gains of reperfusion with the fragility of recovering brain tissue [21].

Guideline Comparison and Discordance

Despite growing agreement that anticoagulation timing should be individualized, major international guidelines still differ in their exact recommendations. These discrepancies arise from differences in healthcare systems, interpretation of evidence, and risk tolerance toward hemorrhagic transformation. Understanding these variations helps clinicians apply the most appropriate framework for their setting.

The American Heart Association and American Stroke Association (AHA/ASA) guidelines recommend starting oral anticoagulation between **4 and 14 days** after an ischemic stroke, depending on stroke severity and the presence of hemorrhagic transformation. They emphasize caution in patients with large infarcts or early bleeding on imaging but leave the final decision to clinician judgment [22,23].

In contrast, the United Kingdom's National Institute for Health and Care Excellence (NICE) takes a more conservative stance, advising that anticoagulation be delayed up to **14 days** for disabling or large infarcts, unless a specialist assessment supports earlier initiation. This reflects a cautious approach influenced by medicolegal and safety considerations within the UK's healthcare framework [24].

Asian-Pacific and Japanese stroke guidelines tend to be more conservative still, recommending initiation between **7 and 14 days** after stroke, largely due to higher regional rates of cerebral microbleeds and hemorrhagic complications in older populations [25].

While the specific timing varies, all guidelines now share a common theme: anticoagulation should begin **only after repeat imaging confirms stability and absence of significant hemorrhagic transformation**. The global convergence toward a risk-based, rather than time-based, approach reflects an important evolution in stroke prevention strategies. Differences in timing mostly reflect variations in resource availability and local safety priorities rather than disagreement about the underlying principles [26].

Minor Stroke

Patients with minor ischemic stroke represent the group most likely to benefit from **early anticoagulation**, as their risk of early recurrent embolic events is substantial while the risk of hemorrhagic transformation is very low. In these patients, infarct volumes are typically small, the blood–brain barrier remains largely intact, and repeat imaging often shows no bleeding or mass effect.

Multiple studies, including subanalyses of the ELAN and TIMING trials, have demonstrated that starting a direct oral anticoagulant within **24 to 48 hours** after minor stroke is generally safe and effective in preventing early recurrent strokes. In the ELAN trial, for instance, early initiation in minor strokes showed no increase in intracranial hemorrhage and a trend toward

fewer ischemic recurrences compared with delayed initiation [27].

In everyday clinical practice, patients with a minor stroke—defined by a National Institutes of Health Stroke Scale (NIHSS) score of 0 to 5—can often start a DOAC once brain imaging excludes hemorrhage and confirms a small infarct. Common practice is to begin treatment between **day 1 and day 3**, provided there is no evidence of hemorrhagic transformation on CT or MRI. The short delay allows time for hemodynamic stabilization and for confirmation that the stroke mechanism is indeed cardioembolic [28].

For stroke where no infarct is visible on imaging, many clinicians start anticoagulation **immediately** after the diagnosis is confirmed, assuming that no contraindications exist. Early initiation in such cases prevents embolic recurrence during the vulnerable first few days, when the risk is highest.

However, caution remains warranted in patients with borderline moderate infarcts, severe hypertension, or known cerebral microbleeds. Even in apparently mild strokes, the decision should be individualized and imaging-guided, as small cortical infarcts may occasionally develop delayed petechial bleeding.

Overall, the evidence supports **early anticoagulation within the first few days** for minor stroke cases. This approach maximizes secondary prevention benefits without exposing the patient to unnecessary bleeding risk, provided imaging is reassuring and risk factors are well controlled [29].

Moderate to Severe Stroke

For patients with moderate or severe ischemic stroke due to atrial fibrillation, the timing of anticoagulation initiation becomes more complex. These patients typically have larger infarct volumes, greater disruption of the blood–brain barrier, and higher susceptibility to hemorrhagic transformation, especially if they have received reperfusion therapy. The key principle is that the risk of bleeding must be outweighed by the benefit of preventing early recurrent embolism.

Observational data and randomized trials suggest that in **moderate strokes** (NIHSS 6–15), anticoagulation is usually safe to start between **day 4 and day 7**, provided that follow-up imaging shows no evidence of hemorrhage. In the TIMING trial, patients in this category had comparable outcomes whether anticoagulation was started early (within 4 days) or later (day 5–10), indicating that flexibility is possible as long as imaging confirms infarct stability [30].

In **severe strokes** (NIHSS >15 or infarct volumes exceeding 60 mL), the situation is different. The risk of hemorrhagic transformation rises sharply, especially in the setting of large cortical infarcts or early edema. Studies such as RAF-NOAC and ELAN suggest that anticoagulation in this group should be delayed for at least **12 to 14 days**, sometimes longer if hemorrhagic transformation is present or mass effect is evolving [31]. Serial imaging is essential, and decisions should be guided by radiological stabilization rather than arbitrary time points.

In practical terms, most stroke centers perform a **repeat CT or MRI around day 7** to reassess the infarct bed. If there is no parenchymal hematoma and the patient is clinically stable, anticoagulation can be initiated cautiously. For large infarcts with space-occupying effects, anticoagulation is postponed until brain swelling subsides and imaging confirms resolution of early hemorrhagic changes [32].

Moderate and severe strokes therefore require an individualized, imaging-based approach rather than adherence to a fixed schedule. The timing must reflect both the patient's recovery trajectory and the biological readiness of the infarcted tissue. This tailored strategy helps minimize the danger of catastrophic intracranial hemorrhage while still ensuring timely secondary prevention [33].

High Hemorrhagic-Risk Brains

A subset of patients with AF-related stroke have brains that are particularly vulnerable to bleeding once anticoagulation begins. Recognizing these **high hemorrhagic-risk profiles** is crucial to avoid devastating complications such as symptomatic intracerebral hemorrhage or massive parenchymal hematoma. Timing in these cases must be guided by detailed imaging and clinical judgment rather than by general rules.

Patients with **hemorrhagic transformation** on initial or follow-up imaging represent the most immediate concern. The Heidelberg classification distinguishes between mild petechial bleeding (HI1 or HI2) and more serious parenchymal hematomas (PH1 or PH2). Anticoagulation can usually be started cautiously after several days in cases of HI-type bleeding once repeat

imaging confirms stability, but it should be postponed well beyond **14 days** in the presence of PH2 or significant mass effect [34].

Another important risk group includes those with **cerebral microbleeds** or **cortical superficial siderosis** on susceptibility-weighted MRI, findings often associated with **cerebral amyloid angiopathy (CAA)**. Studies such as CROMIS-2 have shown that patients with more than five microbleeds—especially in lobar locations—face a markedly higher risk of intracranial hemorrhage under anticoagulation. In such patients, a delayed and cautious start is recommended, often accompanied by blood pressure optimization and avoidance of concurrent antiplatelet therapy [35].

Patients with **previous intracerebral hemorrhage**, advanced age, or severe small-vessel disease also belong in this high-risk category. In these individuals, clinicians should consider not only delaying anticoagulation but also alternative preventive strategies such as left atrial appendage occlusion (LAAO) if the risk–benefit balance is unfavorable [36].

For patients with **reperfusion-related changes**—for example, contrast staining or small subarachnoid bleeds after thrombectomy—the decision depends on close imaging follow-up. Minor contrast leakage may not preclude early anticoagulation, but true hemorrhage demands postponement and re-evaluation at 1 to 2 weeks [37].

Ultimately, the goal in these high-risk brains is not rigid delay but **careful risk balancing**: anticoagulation should begin only when imaging confirms that vascular integrity has recovered sufficiently to tolerate therapy. This approach preserves the benefits of stroke prevention while minimizing the likelihood of intracranial bleeding [38].

Agent Selection and Dosing Strategy

The introduction of direct oral anticoagulants (DOACs) has fundamentally changed how clinicians manage atrial fibrillation–related stroke. Compared to warfarin, DOACs have a rapid onset of action, predictable pharmacokinetics, and a significantly lower risk of intracranial hemorrhage, making them the preferred agents for most patients resuming anticoagulation after ischemic stroke [39].

Among the available DOACs—dabigatran, rivaroxaban, apixaban, and edoxaban—all have demonstrated similar efficacy in preventing stroke recurrence but differ slightly in their bleeding risk and renal clearance. Apixaban and edoxaban are generally favored for elderly patients or those with renal impairment due to their safer bleeding profiles, while rivaroxaban and dabigatran may be suitable for younger patients with preserved renal function [40].

The key principle is to start at the **approved full therapeutic dose** unless there is a specific indication for dose reduction, such as impaired renal function or low body weight. Underdosing for fear of bleeding has been linked with higher rates of recurrent embolic stroke without a significant reduction in bleeding risk. Therefore, decisions about dose adjustment should be guided by objective laboratory values rather than clinical anxiety [41].

Warfarin, while effective, is now reserved for patients with mechanical heart valves, severe renal failure, or specific contraindications to DOACs. When warfarin is used, anticoagulation should begin only after the acute phase, typically **10 to 14 days** post-stroke, and without heparin bridging, as bridging substantially increases the risk of intracranial bleeding [42].

Routine laboratory monitoring is not required for DOACs, but renal and hepatic function should be checked at baseline and at regular intervals. For patients taking concomitant medications such as antiplatelets, antifungals, or antiepileptics, clinicians must be alert for drug–drug interactions that may alter DOAC levels and bleeding risk [43].

In summary, DOACs are the preferred agents for restarting anticoagulation after AF-related stroke due to their improved safety profile and convenience. Proper dosing, avoidance of unnecessary bridging, and awareness of comorbidities are the cornerstones of safe and effective secondary prevention [44-48].

Consensus Algorithm for Practice

Based on data from randomized trials, registries, and guideline comparisons, a practical consensus has emerged for when to start oral anticoagulation after AF-related ischemic stroke. This approach blends clinical experience with imaging-based assessment and provides an easy-to-follow framework suitable for everyday stroke care [49-56].

The first step is to **confirm stroke subtype and exclude hemorrhage**. Brain imaging—CT or MRI—should be performed at baseline and repeated if there is any clinical deterioration or before initiating therapy in moderate-to-severe cases. The decision

then depends on stroke size, neurological severity, and imaging findings.

1. **small infarct (NIHSS 0–5, infarct <25 mL)**
    - Start DOAC within **1–3 days**, provided there is no bleeding or mass effect on imaging.
    - If thrombolysis was given, delay to day 3–4 and repeat imaging before initiation.
2. **Moderate infarct (NIHSS 6–15, infarct 25–60 mL)**
    - Begin between **day 4–7**, after confirming stable imaging and absence of hemorrhagic transformation.
    - Earlier starts (around day 4) may be considered for deep or lacunar infarcts with reassuring imaging.
3. **Severe or large infarct (NIHSS >15, infarct >60 mL)**
    - Delay anticoagulation until **day 12–14** or longer if parenchymal hematoma or mass effect persists.
    - Repeat imaging before starting and ensure adequate blood pressure control.
4. **Hemorrhagic transformation (HI1–HI2)**
    - Reassess at 7–10 days; initiate only after stability is confirmed.
    - For PH1 or PH2, delay beyond **14–21 days**, with multidisciplinary review.
5. **High hemorrhagic-risk brain (multiple microbleeds or probable CAA)**
    - Consider delayed or modified approach; avoid concomitant antiplatelets; discuss possible LAAO if bleeding risk is prohibitive.

The **preferred agents** are DOACs, started at the standard therapeutic dose unless renal function dictates adjustment. Heparin bridging should be avoided, and concurrent antiplatelet therapy should only be continued if strictly indicated.

This simple timing framework—early for minor strokes, intermediate for moderate ones, and delayed for severe or hemorrhagic cases—captures the balance between efficacy and safety demonstrated in ELAN, TIMING, and SoSTART. Applying this algorithm consistently across stroke units promotes evidence-based, individualized, and safe initiation of anticoagulation [49-56].

Research Gaps (2025 and Beyond)

Despite advances in defining anticoagulation timing after AF-related stroke, key uncertainties persist. Trials such as ELAN, TIMING, and SoSTART excluded patients with large infarcts, hemorrhagic transformation, or high bleeding risk, leaving gaps in evidence for these groups. Future studies should target such populations, using imaging and biomarkers to determine safer initiation thresholds [57]. Advanced neuroimaging—like diffusion-perfusion mismatch, blood–brain barrier mapping, and susceptibility-weighted imaging—may soon guide earlier and safer anticoagulation decisions [58]. AI-based predictive models integrating clinical, imaging, and laboratory data show promise for individualized timing and standardized care [59]. Nonpharmacologic options, notably left atrial appendage occlusion, are being explored as alternatives or adjuncts for patients with recurrent hemorrhage or high microbleed burden [60]. Global applicability remains a concern, as most trials originate from high-resource settings. Broader multicenter collaboration is needed to ensure feasibility across diverse healthcare systems [61]. Overall, future strategies will shift from fixed timing rules to personalized, data-driven models integrating imaging, AI, and pragmatic research to optimize anticoagulation timing in stroke care [62].

Conclusions

The timing of oral anticoagulation after atrial fibrillation–related ischemic stroke remains a crucial yet nuanced decision that directly affects patient outcomes. Over the past decade, evidence from randomized trials and registries has transformed clinical practice from reliance on rigid, time-based rules toward more flexible, individualized strategies guided by stroke severity and imaging findings.

Data from ELAN, TIMING, and SoSTART trials have shown that for most patients with small or moderate infarcts, starting a direct oral anticoagulant within the first week is both safe and effective, significantly reducing the risk of early recurrent ischemic stroke without increasing major bleeding. In contrast, patients with large infarcts, hemorrhagic transformation, or unstable

imaging findings continue to benefit from a delayed approach. The once standard “1-3-6-12 day rule” now serves as a rough orientation rather than a strict protocol.

The use of advanced imaging has further refined these decisions by identifying patients at higher bleeding risk, such as those with parenchymal hematoma or multiple cerebral microbleeds. Imaging-guided, rather than purely time-based, initiation allows for more confident and individualized therapy.

Direct oral anticoagulants have become the agents of choice for secondary prevention due to their improved safety profile and ease of use compared with warfarin. When combined with structured follow-up, patient education, and multidisciplinary care, they enable safe and timely resumption of therapy for most stroke survivors.

In practice, the goal is simple: start anticoagulation as early as safely possible, but not before the brain is ready. The best decisions come from integrating clinical assessment, imaging confirmation, and patient-specific factors rather than adhering to arbitrary timing rules. This patient-centered, pragmatic approach provides the greatest protection from both recurrent embolism and intracranial bleeding, bringing the art and science of stroke care into closer alignment.

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