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Comparative study of the efficacy of direct oral anticoagulants (DOACS) versus vitamin k antagonists (VKAS) in the resolution of left ventricular thrombi at the University Hospital of Tangier: A study of 50 cases

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Abstract

Introduction: Left ventricular (LV) thrombi represent a notable complication of cardiac diseases, particularly ischemic heart disease, significantly increasing the risk of systemic thromboembolic events. Anticoagulant treatment is essential for preventing these complications and promoting thrombus resolution. This study aims to compare the efficacy and safety of direct oral anticoagulants (DOACs) versus vitamin K antagonists (VKAs) in resolving LV thrombi.

Methodology: This retrospective observational study was conducted over two years in the cardiology department at the University Hospital Center (CHU) of Tangier, including 50 patients with echocardiographically confirmed LV thrombus. Exclusion criteria were patients already on anticoagulation therapy, those with atrial fibrillation (AF), or a history of venous thromboembolic events. Patients were divided into two groups (DOACs vs VKAs) and assessed for efficacy (echocardiographic resolution of thrombus at 6 months) and safety (incidence of bleeding and stroke).

Results: Overall mortality from all causes during follow-up was 15%. At six months, thrombus resolution varied depending on the anticoagulant treatment. In the group treated with direct oral anticoagulants (DOACs), complete resolution was observed in 75% of patients, partial resolution in 20%, and no resolution in 5%. In the group treated with vitamin K antagonists (VKAs), complete resolution occurred in 87% of patients, partial resolution in 10%, and no resolution in 3%.

Hemorrhagic complications were reported in both groups. In the DOAC group, minor bleeding, such as gingival bleeding and hematuria, was observed in 17% of patients, while major bleeding, including intracerebral hemorrhage, was recorded in 3%. In the VKA group, minor bleeding occurred in 30% of patients, and major bleeding in 12%. INR instability was noted in 50% of patients receiving VKAs.

Conclusion: VKAs show slightly greater effectiveness in LV thrombus resolution but at the expense of increased bleeding risk. DOACs, with their favorable safety profile, constitute an appropriate therapeutic alternative, especially for patients at high bleeding risk or those who have difficulty maintaining stable INR levels.

Keywords: Anticoagulation; Thrombus Resolution; Direct Oral Anticoagulants (DOACs); Vitamin K Antagonists (VKAs); Hemorrhagic and Embolic Complications

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1. Introduction

Left intraventricular thrombi (LV thrombi) represent a significant complication of cardiac diseases, particularly ischemic cardiopathies, increasing the risk of systemic thromboembolic events. Anticoagulant therapy is essential to prevent these complications and promote thrombus resolution. Historically, vitamin K antagonists (VKAs) have been the standard treatment. However, the emergence of direct oral anticoagulants (DOACs) offers potential alternatives with distinct pharmacokinetic profiles and various clinical implications. This study aims to compare the efficacy and safety of DOACs versus VKAs in resolving LV thrombi.

2. Methodology

2.1. Study Type

A retrospective and observational study conducted over a period of two years at the cardiology department of CHU Tanger.

2.2. Study Population

Total sample: 50 patients

2.3. Inclusion Criteria

Patients with confirmed LV thrombus diagnosed via echocardiography.

2.4. Exclusion Criteria

- Patients under chronic anticoagulation before thrombus discovery
- Patients with atrial fibrillation (AF)
- Patients with a history of venous thromboembolism (VTE)

2.5. Etiologies of LV Thrombus: (Fig 1)

- Ischemic cardiopathy: 80%
- Dilated cardiomyopathy (DCM): 8%
- Thrombophilia: 6%
- Peripartum cardiomyopathy: 2%
- Other causes: 4%

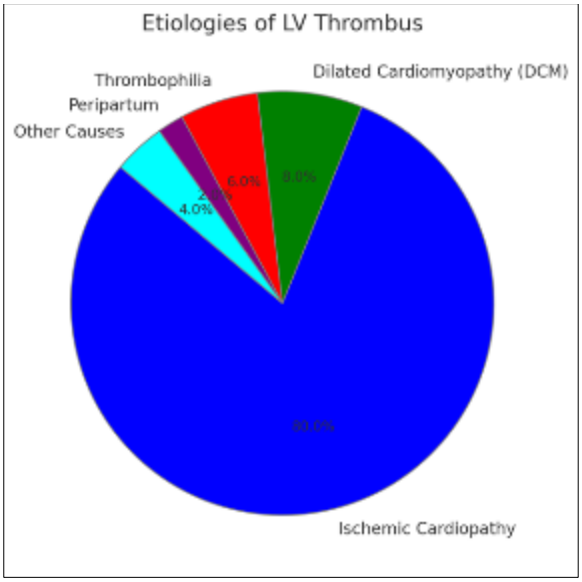

Figure 1 Etiologies of LV Thrombus

2.6. Study Groups

- DOAC Group: Patients on direct oral anticoagulants
- VKA Group: Patients on vitamin K antagonists

2.7. Evaluation Criteria

- Efficacy: Complete thrombus resolution rate at six months (echocardiography)
- Safety: Incidence of minor and major bleeding, as well as embolic complications (stroke).

3. Results

3.1. Mortality

The all-cause mortality rate during follow-up was 15%.

Thrombus Resolution at Six Months: (Fig 2)

3.1.1. DOAC Group (n=25)

- Complete resolution: 75%
- Partial resolution: 20%
- No resolution: 5%

3.1.2. VKA Group (n=25)

- Complete resolution: 87%
- Partial resolution: 10%
- No resolution: 3%

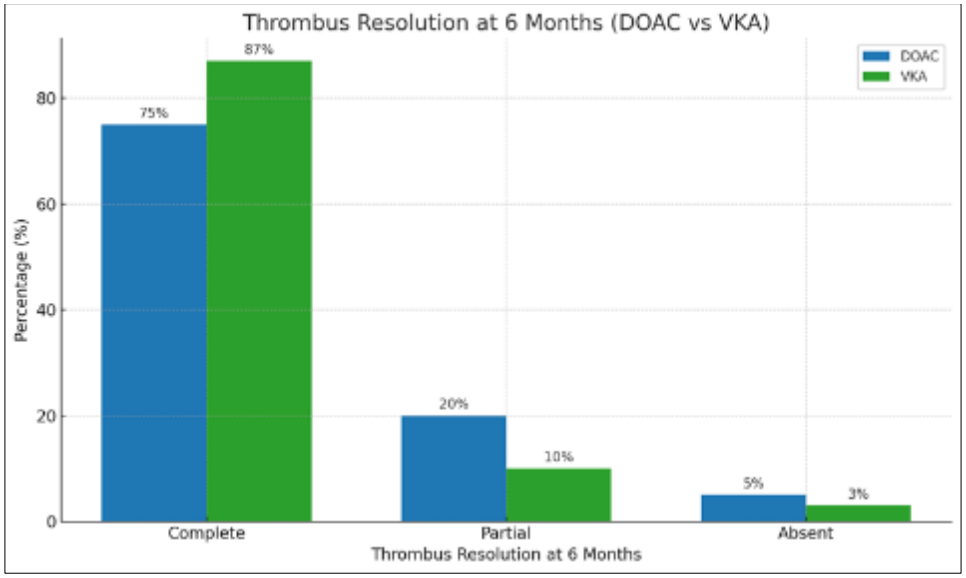

Figure 2 Thrombus resolution at 6 months (DOAC vs VKA)

3.2. Hemorrhagic Complications: (fig 3)

3.2.1. DOAC Group

- Minor bleeding (gingival bleeding, hematuria): 17%
- Major bleeding (intracerebral): 3%

3.2.2. VKA Group

- Minor bleeding: 30%
- Major bleeding: 12%
- INR instability: 50%

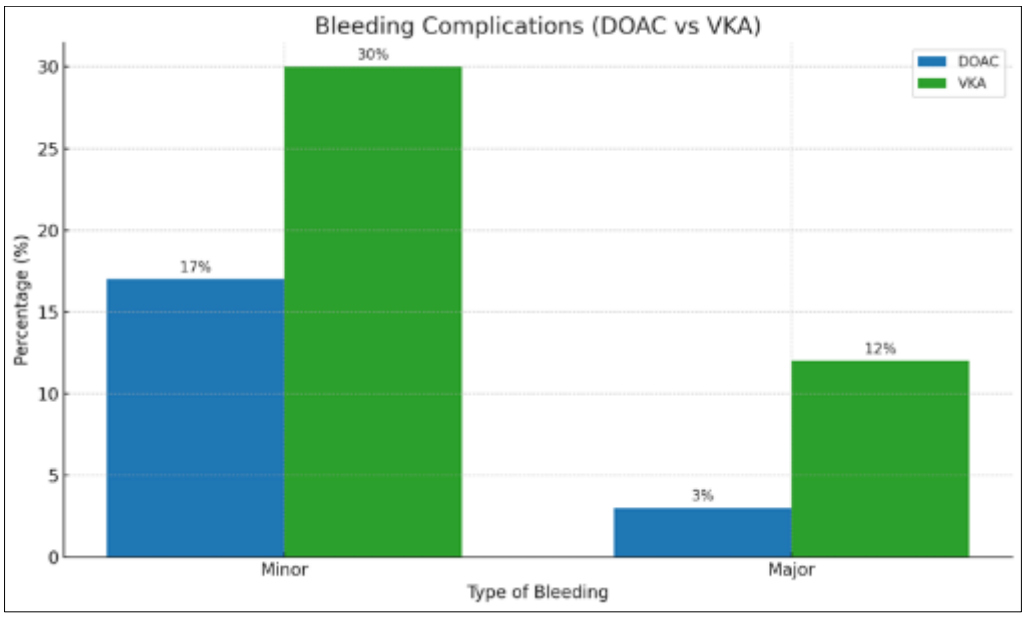

Figure 3 Bleeding Complications (DOAC vs VKA)

3.3. Embolic Complications (Stroke): (fig 4)

- DOAC Group: 2%
- VKA Group: 7%

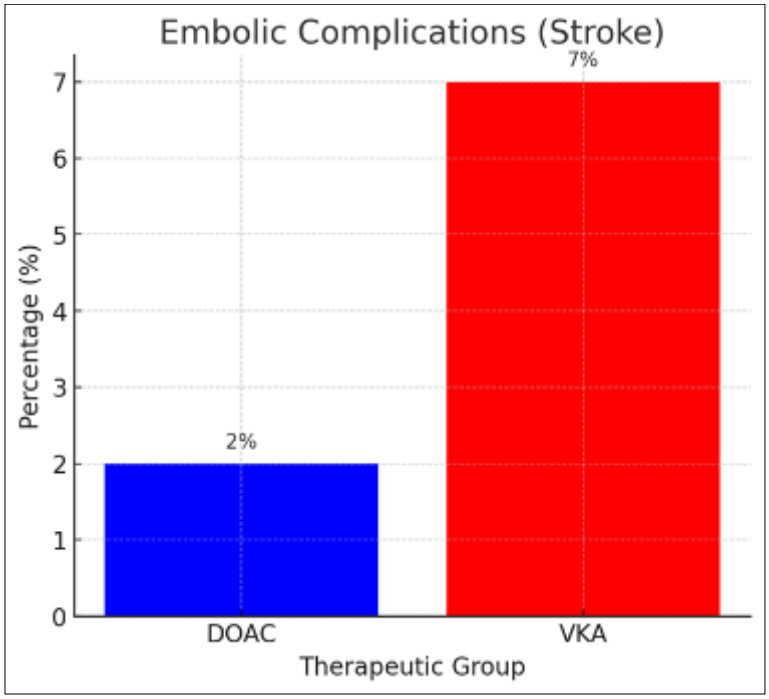

Figure 4 Embolic complication (Stroke)

4. Discussion

4.1. Effectiveness of VKAs versus DOACs in LV Thrombus Resolution

Our study indicates that VKAs offer superior effectiveness in the complete resolution of LV thrombi (87% vs. 75% for DOACs), with a slightly higher failure rate under DOACs (5% vs. 3% under VKAs). These observations align with recent studies on anticoagulant efficacy in this indication.

A recent meta-analysis by Dawwas et al. (2022) (1) showed a slight superiority of VKAs over DOACs in LV thrombus resolution, attributed to their stronger impact on fibrinogen reduction and vitamin K pathway activation, which plays a key role in the coagulation cascade.

However, other studies moderate these findings. A study by Lip et al. (2021) (2) assessed the use of DOACs, particularly rivaroxaban and apixaban, for LV thrombus treatment. The authors reported acceptable DOAC efficacy (thrombus resolution in 45-55% of cases), albeit slightly lower than VKAs. Their main advantage lay in better biological stability and the absence of regular INR monitoring.

Additionally, an analysis of 2,395 patients comparing DOACs and VKAs for LV thrombus treatment reported comparable thrombus regression rates between the two drug classes (71.4% for DOACs vs. 71.9% for VKAs), suggesting that DOACs could be a viable alternative in certain clinical situations.

4.2. Safety Profile: Less Bleeding with DOACs

Our study found that patients on VKAs had a higher bleeding risk, with 30% minor and 12% major bleeding compared to 17% and 3%, respectively, under DOACs. These results align with existing literature, which indicates that VKAs are associated with a higher bleeding risk due to INR instability and frequent dose adjustments.

A systematic review by Piazza et al. (2020) (3) strongly associated VKAs with significant INR variability, increasing the risk of hemorrhagic and thromboembolic complications. The INR instability observed in 50% of patients on VKAs in our study illustrates this issue and highlights the challenges of using this drug class.

Conversely, DOACs offer more stable pharmacokinetics, requiring neither frequent biological monitoring nor complex dose adjustments. A meta-analysis (4) confirmed that DOACs reduce the risk of intracranial hemorrhage compared to VKAs, reinforcing their safety profile, particularly in high-bleeding-risk patients.

4.3. Perspectives and Clinical Implications

Our study highlights a crucial clinical dilemma: choosing between the slightly superior efficacy of VKAs and the better safety profile of DOACs. Treatment decisions should be individualized based on patient risk profiles:

- VKAs remain recommended for patients requiring rapid and complete thrombus resolution, provided rigorous INR monitoring can be ensured.
- DOACs emerge as a safer alternative, particularly in patients with a high hemorrhagic risk or difficulty maintaining stable INR levels.

To refine these conclusions and optimize clinical recommendations, large-scale prospective and randomized studies are needed.

4.4. Comparison with Other Studies

- Dawwas et al. (2022): This study demonstrated moderate VKA superiority over DOACs in thrombus resolution but with an increased bleeding risk.
- Lip et al. (2021): DOACs showed acceptable efficacy with significantly improved safety compared to VKAs.
- Piazza et al. (2020): VKAs were associated with INR instability and a higher risk of major hemorrhagic complications.
- Lattuca et al. (2023) (5): In a multicenter retrospective study, DOACs demonstrated a thrombus resolution rate similar to VKAs, suggesting their relevance in this indication.

5. Conclusion

This study highlights that VKAs are more effective than DOACs for LV thrombus resolution but at the cost of an increased bleeding risk. DOACs, while slightly less effective, offer an attractive alternative due to their improved safety profile and biological stability.

Therapeutic decisions should be individualized based on the patient's thrombotic and hemorrhagic risks. Large-scale prospective studies are required to refine these conclusions and determine the optimal role of DOACs in this indication.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

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