

Management of Patients at Risk for and With Left Ventricular Thrombus: A Scientific Statement from the American Heart Association 2022

1. Is echocardiography adequate for detection of suspected LV thrombus, or is CMR (or cardiac CT) indicated when there is concern for LV thrombus?

Transthoracic echocardiography is the standard imaging technique for the detection of LV thrombus.

We suggest that cardiac MR may be most appropriate when:

- There is the suggestion of a possible LV thrombus on echocardiogram but echocardiography imaging even with an ultrasound-enhancing agent (Definity) is not diagnostic.
- Echocardiography does not demonstrate LV thrombus but a clinical concern remains (for example, cardioembolic stroke).

TEE does not generally improve visualization of the LV apex.

2. In the era of DAPT after ACS and PCI, which patients should be considered for OAC therapy after anterior/apical MI and akinesis, particularly given the increased bleeding rates with combined OAC therapy and antiplatelet therapy?

Routine prophylactic anticoagulation in all patients after anterior/apical MI and akinesis, does not appear to be supported by data.

- Given the relatively weak data supporting prophylactic OAC in patients with acute anteroapical STEMI treated with reperfusion therapy and anteroapical akinesis, we suggest consideration of OAC on a patient-by-patient basis incorporating the perceived risk of thrombus formation and bleeding and involve shared decision making.
- If prophylactic anticoagulation is initiated after MI, we suggest a 1 to 3-month duration depending on bleeding risk.

3. In those patients with acute MI with visualized LV thrombus, when (if ever) can anticoagulation be stopped? Is a single echocardiogram after 3–6 mo of therapy not demonstrating LV thrombus enough to confidently discontinue?

Therapeutic anticoagulation should be initiated for the treatment of LV thrombus after acute MI, even in the presence of antiplatelet therapy, typically for a duration of 3 months with follow-up imaging at this time point.

4. Which, if any, patients with DCM (cardiomyopathies with depressed LV systolic function not attributable to myocardial ischemia/MI) or HFrEF (not related to acute MI) should be treated with preventive (prophylactic) OAC?

We suggest that patients with DCM should not be prophylactically treated with OAC, with the possible exception of those with specific types of DCM at increased risk for LV thrombus formation.

Specific DCMs (Nonischemic) and Associated Risk Factors for Which Anticoagulation for the Prevention of LV Thrombus Might Be Considered

DCM	Risk factors associated with LV thrombus formation
Takotsubo syndrome	LV dysfunction with LVEF $\leq 30\%$ and/or apical ballooning ^{5,70,71}
Left ventricular noncompaction	History of stroke or TIA ² and/or LV dysfunction ^{5,72,73}
Peripartum cardiomyopathy*	Bromocriptine administration and/or LVEF $\leq 35\%$ ^{7,8,36,74,75}
Hypertrophic cardiomyopathy	Apical aneurysm ^{31,76,77}
Chemotherapy-related cardiomyopathy	LV restrictive filling pattern and/or LVEF $\leq 30\%$ ³²
Cardiac amyloidosis	AL type and/or LV restrictive filling pattern ³³
Cardiomyopathy attributable to Chagas disease	Apical aneurysm ³⁴
Eosinophilic myocarditis	Prior embolic episode ³⁵

In such cases in which OAC is implemented, the recommended duration of preventive OAC for these DCM subtypes is not established; indefinite OAC might be considered unless the LVEF improves or bleeding contraindication occurs.

5. In those with DCM or HFrEF who form LV thrombus and thus may have a predilection to do this, can OAC ever be stopped (even if a follow-up echocardiogram demonstrates LV thrombus resolution)?

We suggest anticoagulation (VK or DOAC) in patients with LV thrombus in the setting of DCM for at least 3 to 6 months, with discontinuation if LVEF improves to $>35\%$ (assuming resolution of the LV thrombus) or if major bleeding occurs.

- There are insufficient study data to determine whether OAC should be continued indefinitely

6. Is anticoagulation really indicated for laminated thrombus (not a more mobile, round, mural thrombus)?

We suggest it may be prudent to treat patients with OAC for newly diagnosed mural (laminated) LV thrombus as one would a patient with a protruding or mobile thrombus.

7. Is DOAC a reasonable alternative to warfarin for the prevention and treatment of LV thrombus

We suggest that, on the basis of supportive though insufficiently powered randomized data, in patients with LV thrombus, DOAC seems to be a reasonable alternative to warfarin.

- The pathophysiology of thrombus formation provides the rationale for the use of anticoagulants, rather than antiplatelet drugs, for the prevention or treatment of LV thrombus

8. What management options are there in patients with persistent LV thrombus despite therapy?

We suggest that, on the basis of consensus opinion, in some patients with persistent LV thrombus, particularly a protruding or mobile thrombus, a trial of an alternative OAC or LMWH (for example, VKA if on DOAC, DOAC if on VKA with repeatedly subtherapeutic INR, LMWH if on VKA with therapeutic INRs) is not unreasonable.

On the other hand, also on the basis of consensus opinion, discontinuation of OAC in patients with persistent mural (laminar) thrombus, particularly if the thrombus becomes organized or calcified, is not unreasonable.

On the basis of consensus opinion, given the very limited safety data and small but likely nonzero risk of embolization, **we do not generally suggest fibrinolytic treatment for the primary purpose of treating LV thrombus.**

At present, there are insufficient data to recommend surgical excision (without other indications for surgery) for the treatment of LV thrombus. Because of the risks of surgery and lack of supportive data, such an approach should be limited to rare circumstances such as:

- Inability to tolerate anticoagulation therapy.
- Perceived high risk of embolization or cardioembolic stroke despite anticoagulation.

MANAGEMENT OF MASSIVE LV THROMBUS

There are insufficient data to preferentially recommend any one approach to large, massive LV thrombi, or obliterating thrombus with OAC, fibrinolytic therapy, and surgical resection.

These rare scenarios are best addressed with a multidisciplinary approach to therapeutic intervention.

LV THROMBUS PERSISTENCE DESPITE ANTICOAGULATION THERAPY

Prolonged anticoagulation and repeated imaging assessment are generally recommended.

Overview of suggested strategies for the prevention and management of LV thrombus

