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# Successful Long-Term Anticoagulation with Low Molecular Weight Heparin in a Patient with Mechanical Mitral Valve and Atrial Flutter

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## Abstract

Mechanical heart valves are associated with high risk of thrombosis and thromboembolic complications. Vitamin K antagonist is the only approved oral medication for the anticoagulation in cases of mechanical heart valves. This poses a challenge in cases where vitamin K antagonists are contraindicated. Although temporary anticoagulation with low molecular weight heparin is common among pregnant patients with mechanical heart valves, data about long term anticoagulation with low molecular weight heparin is limited. We report a successful long-term anticoagulation with low molecular weight heparin in a patient with mechanical mitral valve and atrial flutter.

**Keywords:** Mechanical heart valve, Low molecular weight heparin, Enoxaparin, Warfarin contraindication

We present a 47-year-old male with chronic kidney disease (CKD G3 a/b) and mechanical mitral valve replacement secondary to severe rheumatic mitral regurgitation. He underwent a mechanical mitral valve replacement in another hospital on 15th December 2020 following a presentation of heart failure. He had a non-complicated post-operative course and was discharged home on warfarin. He presented to our hospital on 18th January 2021, with palpitations and skin rash. He was found to have atrial flutter and was admitted for heart rate control. The skin rash appeared immediately after he started warfarin. He has no new medication and did not report fever or contact with sick patients. Clinical examination revealed a heart rate of 145 beats per minute with a blood pressure of 110/75 mmHg. There was a mechanical first heart sound, normal second heart sound without added sounds or murmurs. He had multiple non-palpable red

macules and ecchymosis over the trunk, arms, and legs. He was evaluated by dermatology and the diagnosis of warfarin-induced vasculitis or ecchymosis was suspected. The rash improved after stopping warfarin. Skin biopsy revealed leukocytoclastic vasculitis positive for complement 3 and mild focal positivity for IgA in the blood vessels. Warfarin-induced vasculitis remains in the differential and therefore, the patient was kept off warfarin.

During this period, he was anticoagulated with therapeutic doses of enoxaparin (80 mg twice daily). Anti-factor Xa level was measured regularly to ensure that the patient was in the therapeutic anticoagulation range. His anti-Xa level was between 0.9 and 1.1 IU/mL. The patient was put on phenindione, as an alternative to warfarin, for six months. Phenindione was stopped due to the non-availability of the drug. The patient was on enoxaparin for 20 months. He remained asymptomatic from cardiac

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point of view. Follow-up echocardiography showed normal functioning mitral prosthetic valve with normal gradients (mean gradient of 5 mmHg).

## 1. Discussion

Mechanical prosthetic valves (MHV) are routinely used for the treatment of severe valvular disease in young patients. Despite their longevity profile, MHV are associated with a higher rate of valve thrombosis 8.6% and 1.8% without and with anticoagulation respectively [1]. Multiple factors contribute to the risk of prosthetic valve thrombosis including the type and location of the valve, age, left ventricular dysfunction and atrial fibrillation [2]. The mechanism of valve thrombosis is complex and involves platelet and white cell adhesion, protein absorption and change in the hemodynamics around the prosthetic valve [3]. In addition, the location of the valve plays a significant role in the risk of thrombosis. Mechanical valves in the mitral position have a higher risk of thrombosis than the aortic position. Hence, anticoagulation is needed in patients with MHV.

American Heart Association/American College of Cardiology (AHA/ACC), as well as European Society of Cardiology (ESC), recommend the vitamin K antagonist (VKA) for anticoagulation of MHV [4,5]. Warfarin is the most studied VKA in MHV while the data supporting the use of other VKA is limited. Therefore, AHA/ACC and ESC guidelines endorse the use of warfarin for the anticoagulation of patients with MHV. Unfortunately, data guiding anticoagulation therapy in cases of contraindication to warfarin are insufficient. Direct oral anticoagulants (DOACs) have replaced warfarin in many clinical conditions. However, DOACs are contraindicated in patients with mechanical valves due to an increased risk of stroke and bleeding events [6]. The choice of anticoagulation in patients with MHV who have a contraindication to warfarin is unfractionated heparin or more conveniently low molecular weight heparin (LMWH) [7]. Most of our experience with LMWH in MHV comes from pregnant women with MHV. Warfarin is associated with an increased risk of fetal bleeding and teratogenicity and should be stopped during the first trimester [8]. During the first trimester of pregnancy, the warfarin is usually substituted with dose-adjusted LMWH with monitoring of anti-factor Xa (Anti-Xa) to keep the level 0.8–1.2 IU/mL [5]. The evidence about the use and safety of LMWH in pregnant patients with LMWH is increasing.

The temporary use of LMWH in patients with MHV without pregnancy is limited to case reports and few prospective non-randomized data [9].

### Abbreviations

Anti-Xa	Anti-factor Xa
DOACS	Direct oral anticoagulant
LMWH	Low molecular weight heparin
MHV	Mechanical heart valve
VKA	Vitamin K antagonist

There is a single case report of long-term anticoagulation with LMWH in a patient with a mechanical aortic valve [10]. It is worth noting that the aortic valve position is associated with the lowest risk of thrombosis in cases of MHV. Our case is unique because it has a higher risk of valve thrombosis due to the position of the MHV, mitral position, and the concomitant atrial flutter which add to the risk of valve thrombosis and thromboembolic complications. The prosthetic mitral valve gradients were normal after almost 20 months of anticoagulation with LMWH. Although LMWH is usually weight-based, it is crucial to ensure proper anticoagulation by adjusting the dose based on Anti-Xa level. Monitoring of Anti-Xa is of paramount importance in cases of MHV where the risk of thrombosis is high.

In conclusion, our case demonstrates that long-term anticoagulation with LMWH in MHV with a high risk of thrombosis is safe and can be considered in cases where VKA cannot be used. However, it is crucial to follow anti-Xa level and adjust the dose of LMWH accordingly. Larger randomized studies with extended follow-up are needed to ascertain further the safety of long-term use of LMWH in patients with MHV.

### Author contribution

Conception and design of Study: NA, AA. Literature review: NA, MSA, NA, MA. Data collection: NA, MSA, NA, MA, AA. Drafting of manuscript: NA. Revising and editing the manuscript critically for important intellectual contents: AA. Data preparation and presentation: NA, MSA, NA, AA. Supervision of the research: AA. Research coordination and management: AA.

### Conflict of interest

The authors have no disclosures.

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