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# Factor V Leiden Mutation & Recurrent Venous Thromboembolism: A Rare Case Report

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**Abstract:** ***Thrombophilia refers to inherited or acquired hemostatic disorders that lead to a predisposition of blood clot formation. Factor V Leiden (FVL), a point mutation of factor V is the most common cause of inherited thrombophilia in a Caucasian population. It is an autosomal genetic disorder, with incomplete penetrance. Therefore, not all individuals who carry this mutation suffer from venous thromboembolism. Here, we report a case of a 20 years old male suffering from recurrent venous thromboembolism in the form of deep venous thrombosis (DVT), with a history of pulmonary embolism & IVC filter in situ.***

**Keywords:** thrombophilia, incomplete penetrance, venous thromboembolism

## 1. Introduction

Factor V Leiden is an autosomal dominant genetic condition that exhibits incomplete penetrance. The gene that codes the protein is known as F5[1, 2]. Mutation of this gene - a single nucleotide polymorphism is located in exon 10. It is a point mutation of Factor V which leads to a missense substitution of amino acid arginine to glutamine.

Factor V synthesis mainly occurs in the liver. It functions as a co - factor and converts prothrombin to thrombin. Activated protein C limits its clotting ability by cleaving and degrading it. FVL mutation prevents attachment of activated protein C to Factor V. When Factor V remains active, it facilitates overproduction of thrombin leading to generation of excess fibrin and excess clotting.

The excessive clotting can cause deep venous thrombosis (DVT), pulmonary embolism, myocardial infarction (MI), transient ischemic attack, stroke, miscarriage, intrauterine fetal demise & intrauterine growth retardation[3].

FVL mutation is extremely rare in African and Asian countries. Here, we present a case of FVL mutation with a history of pulmonary embolism and recurrent DVT, along with IVC filter insertion.

## 2. Case

The patient, a 20 years old Indian male, presented with the complaint of acute onset of shortness of breath for 1 day and tenderness and swelling in both lower limbs for the past 1 week. CT pulmonary angiography revealed acute pulmonary thromboembolism involving bilateral main pulmonary arteries, their upper and lower lobar and segmental branches along with acute infarcts in bilateral lung parenchyma and pulmonary hypertension. Lower limb Doppler was suggestive of partial lumen occluding thrombus in entire venous system of both lower limbs.

His baseline complete blood count, coagulation profile and thyroid function test were within normal limits. Thrombophilia profile showed within normal range of protein S (75; normal range: 77 - 143%) and protein C (117; normal range: 67 - 195%). He also tested negative for anti cardiolipin, anti beta 2 glycoprotein, antiphospholipid and TSH recetor antibodies. Anti thrombin III, thyroglobulin and homocysteine activity were also within normal limits.

Genomic DNA extracted from him was amplified and subjected to polymerase chin reaction. Factor V Leiden (heterozygous) was detected.

He underwent pulmonary thrombosuction and catheter directed thrombolysis. IVC Filter was also inserted a week later. Anticoagulation therapy was started and genetic counseling was done.

About a year later, he again presented with left lower swelling and tenderness. On history taking, he revealed that he had not been taking anticoagulant for the past 2 months. Physical examination was unremarkable. Left lower limb Doppler revealed extensive thrombosis in iliac, common femoral, superficial femoral and popliteal veins. He was again subjected to thrombosuction ant catheter based thrombolysis. Anticoagulation therapy was restarted.

## 3. Discussion

In this report, we present the case of a young Indian male with a history of recurrent DVT that was complicated by FVL mutation.

Hereditary thrombophilia is caused by FVL mutation (which leads to activated protein C resistance), prothrombin gene mutation, anti thrombin deficiency, protein C and protein S deficiency and antiphospholipid antibody syndrome. Thrombophilia results in venous thromboembolic disease contributing to substantial cardiovascular morbidity and mortatlity[3]. The FVL mutation has been significantly related to recurrent DVT, recurrent stroke, coronary artery disease (CAD), pregnancy complications like hypertensive disorder of pregnancy, late pregnancy loss, stillbirth, placental abruption and intrauterine growth retardation (IUGR) [4, 5]. Patients who are heterozygous for this condition are at 3 - 8 fold increased risk for VTE and homozygous individuals are

at 10 - 80 fold increased risk for venous thromboembolism (VTE) [6, 8, 11].

## 4. Conclusion

In conclusion, patients with FVL mutation are at an increased risk for VTE[7] (eg: DVT, pulmonary embolism, CAD, stroke, fetal loss, IUGR). It is important to have a good knowledge of FVL mutation and its potential impact on cardiovascular morbidity[9, 10]. Appropriate genetic counseling and clinical intervention should be considered to prevent adverse outcomes[12].

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