Case Report: Unprovoked venous thromboembolism in a young adult [version 1; referees: 1 approved with reservations]

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Abstract
A 24-year-old male was presented to us with sudden onset of chest pain and dyspnea for the past one hour. There was no history of calf pain, trauma, surgery, prolonged immobilization, long-haul air travel, bleeding diathesis or any other co-morbidity. The patient denied any addiction history. The Electrocardiogram showed tachycardia with S₁Q₃T₃ pattern. The left arterio-venous Doppler study was suggestive of a thrombus in popliteal vein and sapheno-popliteal junction. The CT-Pulmonary Angiogram scan was suggestive of a massive pulmonary thromboembolism. The patient was thrombolysed with Intravenous Alteplase immediately and was put on tab Rivaroxaban for maintenance. He was later discharged after being stable. Unprovoked venous thromboembolism (VTE) is very rare and has the potential to lead to pulmonary embolism which could be disastrous, especially in young adults. We present such a case where unprovoked VTE was diagnosed and treated. This case suggests that high clinical suspicion is the key for the diagnosis of acute pulmonary embolism, especially in the absence of history suggestive of deep vein thrombosis.

Keywords
Pulmonary Embolism, Idiopathic, Thromboembolism
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### Author roles
Dhabhar J: Conceptualization, Data Curation, Formal Analysis, Funding Acquisition, Investigation, Methodology, Project Administration, Resources, Software, Supervision, Validation, Visualization, Writing – Original Draft Preparation; Mehta V: Conceptualization, Data Curation, Formal Analysis, Funding Acquisition, Investigation, Methodology, Project Administration, Resources, Software, Supervision, Writing – Original Draft Preparation, Writing – Review & Editing; Desai N: Writing – Review & Editing; Dawoodi S: Methodology, Resources, Writing – Review & Editing; Zaman SB: Conceptualization, Project Administration, Supervision, Writing – Original Draft Preparation, Writing – Review & Editing

### Competing interests
No competing interests were disclosed.

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### How to cite this article

First published: 14 Feb 2019, 8:182 (https://doi.org/10.12688/f1000research.18202.1)
Introduction
Venous thromboembolism (VTE) consists of pulmonary embolism (PE) and deep vein thrombosis (DVT). It is one of the leading causes of cardiovascular disability and impaired quality of life. It also causes major long-term complications, which include recurrent VTE, chronic thromboembolic pulmonary hypertension and post-thrombotic syndrome.

PE is said to be the third leading cause for cardiovascular mortality (after myocardial infarction and stroke). It leads to 100,000 deaths annually. It is not only the leading preventable cause of death in admitted patients but also the leading cause of deaths in mothers during pregnancy in developed countries.

Idiopathic or unprovoked VTE is defined as “any VTE in the absence of an identifiable predisposing factor". Taking into consideration that unprovoked VTE is very rare, especially in the young adults, we put forward a case report of VTE in a 24-year-old man.

Case report
A 24-year-old man was brought to the emergency department of a hospital, by his office-colleagues, complaining of sudden onset of chest pain and dyspnea at rest, for the last one hour. It was not associated with sweating, palpitations, cough, hemoptysis, syncope, giddiness, leg pain, pedal edema, fever, rash, or any bleeding manifestations.

History of calf pain, trauma, surgery, prolonged immobilization, long-haul air travel, bleeding diathesis or any other co-morbidity was not reported by the patient. The patient also denied any addiction history. Family history was found to be insignificant.

On admission, the patient’s heart rate was 114/min, and blood pressure was 106/90 mmHg. His respiratory rate was 22/min, and O₂ saturation rate was 82% at room air. BMI was 20.76 kg/m². There was no murmur or gallop on cardiovascular examination. Air entry was reduced in the left infra-axillary region. Electrocardiogram (ECG) showed tachycardia with S₁Q₃T₃ pattern, and chest X-ray was suggestive of obliteration of left costo-phrenic angle. The D-Dimer (17.31 μg/ml) was elevated, 34 times above the normal upper limit (0.5 μg/ml).

CT-Pulmonary Angiogram (Figure 1) was suggestive of a massive pulmonary thromboembolism. The pulmonary trunk was dilated to ~30 mm. There was a non-lumen occluding circumferential filling defect in the main pulmonary trunk, with maximum thickness of 4.5 mm. A large partial-lumen occluding filling defect was noted in the left main pulmonary artery, which was extending further into the hilar branch, occluding the lumen completely. Another larger complete lumen occluding filling defect was noted in the right main pulmonary artery. These filling defects were extending into the segmental and sub-segmental branches of the lateral segment of the right middle, lingual and bilateral lower lobe. The RV: LV ratio was 2:1. All four pulmonary veins were normal, and there was no evidence of mediastinal pathology.

On admission, the patient also underwent a bilateral arteriovenous Doppler study, which was suggestive of a partially-lumen-occluding thrombus in the proximal part of left popliteal vein and a completely lumen-occluding thrombus at the left saphenopopliteal junction, approximately 14 cm long. The veins of both legs showed arterialized waveforms.

On 2D echocardiography, right atrium and right ventricle was mildly dilated with grade I, tricuspid regurgitation (TR) and pulmonary arterial systolic pressure by TR jet was 55 mmHg suggestive of moderate pulmonary artery hypertension. No regional wall motion abnormality was observed and left ventricular ejection fraction was 60%.

The coagulation profile was within normal limits. All other blood investigations i.e. hemogram, serum electrolytes, renal and liver function tests were within normal range. The patient had mild hyperuricemia with serum uric acid level being 7.4 mg/dL (Normal – 3.5 – 7.2 mg/dL). Cardiac enzymes (Creatine PhosphoKinase-MB and Troponin T) were mildly elevated.

Although it was a clear case of massive VTE, the underlying etiology of such an event could not be extrapolated. Since the patient was a 24-year-old man, without any risk factors or comorbidities, the final diagnosis of unprovoked VTE was made.

The patient was thrombolysed with Injection Alteplase infusion (100mg IV, over two hours) with Injection Enoxaparin 60 mg given subcutaneously every 12 hours. After which, the patient developed hypotension which was treated with inotropic support. Although he had tachycardia post-thrombolysis for the next two days, his blood pressure returned to normal on the third day. 48-hours after giving thrombolytic treatment, the left lower limb venous doppler was done which was suggestive of a partial-lumen occluding the thrombus in popliteal vein extending from saphenopopliteal junction to mid-leg approximately 10 cm long. The CT-pulmonary angiogram was not repeated.
References


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Open Peer Review

Current Referee Status: ?

Version 1

Referee Report 15 February 2019

https://doi.org/10.5256/f1000research.19910.r44458

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This is an interesting case report which discusses a rare phenomenon of unprovoked venous thromboembolism and its management. I would congratulate the authors for their work. However, there are a few concerns:

Though the authors have mentioned that there was no history of long air travel, it will be helpful to know if the patient had any history of long car travel before the event precipitated. It has been noted that DVT is commonly encountered in patients who undergo long car travel. Such information, if added, shall make the physicians more aware.

Did the physicians/authors conduct any clinical examination to test DVT. Were Homan’s or Mosses sign performed. If yes, what were the results. If not, it will be helpful to know the reason for not performing them. A little detail on clinical examination of the patient should also be added to the manuscript besides the symptoms and findings.

It will also be helpful to know the Trop I values, if they were assessed by the authors.

The authors have mentioned that patient was kept on Rivaroxaban. Were there any side effects that were encountered. It will also be helpful if the authors could mention about the follow-up period of the patient in the manuscript.

Was any assessment done in the post discharge period. Was there any change in vessel size? Any adaptive remodeling seen with the treatment using Rivaroxaban.

Was the patient satisfied with the treatment? Any satisfaction index which was assessed. Authors may add it if found to be appropriate. They could use the attached reference for the same.

References
Is the background of the case's history and progression described in sufficient detail?
Yes

Are enough details provided of any physical examination and diagnostic tests, treatment given and outcomes?
Partly

Is sufficient discussion included of the importance of the findings and their relevance to future understanding of disease processes, diagnosis or treatment?
Yes

Is the case presented with sufficient detail to be useful for other practitioners?
Yes

**Competing Interests:** No competing interests were disclosed.

**Reviewer Expertise:** Medicine, Surgery, Orthopaedics, Spine, Innovation, Technoinnovations

I have read this submission. I believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard, however I have significant reservations, as outlined above.

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**Author Response 15 Feb 2019**

**Sojib Bin Zaman,** International Centre For Diarrhoeal Disease Research, Bangladesh (icddr,b), Bangladesh

Thank you Dr for reviewing our paper and taking your time out for the same.
Please find my replies to your queries.
- There was no history of prolonged air or car travel. Also, the detailed examination was performed and was deemed unremarkable; hence was not mentioned here (including Homan's and Moses sign).
- Trop I level test are not available in our center, hence was not done, However, we did Trop T and CPK MB, which were normal.
- The patient had followed up in our center for the first three months, following which relocated to Uttar Pradesh, India (his hometown). He experienced no side effects of Rivaroxaban. At three months, post discharge, a lower limb doppler was repeated which showed more than 50% reduction in size of the obstructing thrombus as compared to the previous one done at admission. Post three months of discharge, the patient has not returned back yet and has been lost to follow up.
- The patient was most satisfied with the treatment and the recovery he'd made, but this was not recorded in a form of any official questionnaire (but he had mentioned this verbally); hence not mentioned here.

Hopefully, these comments will satisfy the queries. If you have any more queries, please feel free to post and we shall be happy to reply them.

**Competing Interests:** No competing interests present.
Reviewer Response 19 Feb 2019

**Shakti A. Goel**, Indian Spinal Injuries Centre, India

I had an opportunity to go through the review/reply and believe that the authors have addressed the comments meticulously. The article can be accepted once these details have been added to the article.

This article will certainly be very helpful for the physicians around the globe especially in low to middle income countries.

**Competing Interests:** None