

Acute Subclavian Vein Thrombosis in a Healthy Young Male

Dear Editor,

Upper extremity deep vein thrombosis (UEDVT) refers to thrombosis of the subclavian (18% to 69%), axillary (5% to 42%) or brachial vein (4% to 13%).¹ It accounts for 4% to 10% of all cases of deep vein thrombosis¹ and can result in pulmonary embolism (PE) or post-thrombotic syndrome (PTS) of the arm and even death in severe cases.¹

We describe a case of UEDVT in a healthy young Chinese male who regularly weight lifted and had a minor trauma before presentation.

Case Report

A 19-year-old healthy Chinese male military personnel in active duty presented 2 weeks history of left arm swelling and recurrent purple discolouration post-exertion. He fell on his outstretched left hand while walking 2 weeks before presentation. He was not carrying any load and there was no direct trauma to the shoulder or axilla. Few days post incident, his left hand turned purple and swelled on exertion. The left upper limb's superficial veins became more prominent. These symptoms resolved spontaneously with adequate rest. In the following week, the swelling and purple discolouration extended to the level of the elbow and took longer to resolve. He was a non-smoker and non-drinker, not on any medications or illicit drug. He had no family history of venous thrombosis or hypercoagulability state. He was an athletic individual who performed hourly weight training 3 times per week for the past few years.

On examination, purple discolouration was noted over the left arm up to the level of the elbow with pitting oedema. The skin was warm with prominent superficial veins over the left deltoid region. The distal arterial pulses were palpable with normal capillary refill. There was no neurological deficit. Diagnosis of upper limb venous congestion secondary to venous thrombosis was made. The subject who presented at the primary healthcare centre was referred to a tertiary hospital for further management.

Blood and radiological investigations performed did not reveal any abnormality. The blood investigations included prothrombin time (PT), international normalized ratio (INR) and activated partial thromboplastin time (PTT), anti-cardiolipin IgG and IgM, anti-protein C resistance test, protein C activity, protein S activity and anti-thrombin III. Lupus anticoagulant was absent. Chest x-ray (CXR) and cervical spine x-ray did not reveal any bony abnormality.

Ultrasound (US) Doppler revealed proximal left

subclavian vein thrombosis with partially compressible proximal segment with minimal afterflow or doppler. Magnetic resonance imaging (MRI) of the left thoracic inlet did not reveal the presence of space occupying lesion in the left thoracic inlet, cervical rib or elongated transverse process.

The patient was treated with subcutaneous low molecular weight heparin injection for one week and ongoing oral warfarin of 5 months duration with resolution of symptoms.

Discussion

UEDVT is uncommon compared to lower extremity DVT. It accounts for 4% to 10% of all cases of DVT.¹ Primary UEDVT which encompasses both effort and idiopathic thrombosis accounts for one-third of the cases in UEDVT. Secondary UEDVT is associated with overt predisposing causes such as insertion of central venous catheters and pacemakers.¹⁻³

Effort thrombosis (Paget-Schroetter syndrome), was described by Paget in 1875 and Schroetter in 1884 independently.³⁻⁵ The typical patient is a healthy young athlete with no overt predisposing cause, who develops UEDVT after strenuous activity which usually involves repetitive arm movements. Anatomically, the subclavian vein runs through the costoclavicular space, which is surrounded by the anterior scalene muscle posteriorly, by the clavicle and subclavius muscle anteriorly and superiorly and by the first rib inferiorly. This space is narrowed by the abduction, retroversion or external rotation of the arm. Repeated trauma due to compression of the subclavian vein pinching between the clavicle and the first rib, can result in intimal damage to the vessel wall which activates the coagulation cascade. This mechanism is further aggravated when there is a predisposing anatomical abnormality such as a cervical first rib or abnormal clavicle, abnormal congenital webs or bands and abnormal muscle structures.³⁻⁵

Secondary UEDVT accounts for majority of the cases of UEDVT (80%).¹ Secondary causes include thoracic outlet syndrome (TOS), use of indwelling central venous catheters, thrombophilic disorders, underlying malignancy, arm surgery or trauma, immobilisation and pregnancy.¹⁻³

Zell et al³ who reviewed the clinical records of 82 patients with thrombosis of the upper extremity over a 10-year period reported that in 51 cases the thrombosis was caused by secondary reasons (i.e. central venous catheterisation, malignoma, hypercoagulability, postoperative). Twenty-

eight of the remaining 31 patients with suspected primary thrombosis of the axillary or subclavian vein (Paget-Schroetter syndrome) showed unusual private or occupational physical exercise as the underlying cause. Sixteen patients reported only short physical exercise up to several hours or acute trauma. Longer physical exercise periods (several days, months or even more) were found in the remaining 12 patients.

Investigations include blood tests for hypercoagulable state, fasting homocysteine level, urine pregnancy test and diagnostic imaging.⁵ CXR is performed to exclude underlying pre-disposing bony abnormality such as cervical rib. Imaging modalities to assess the deep venous system include colour duplex ultrasound, contrast venography and magnetic resonance angiography.^{1,2,5}

Complications of UEDVT include PTS (e.g. chronic pain, swelling and exercise fatigue), PE and death.^{1,3,5} Flinterman et al⁶ reviewed 224 patients with UEDVT and reported 10% recurrence in 114 patients with subclavian vein thrombosis. The risk of recurrence was high for female patients, patients with body mass index more than or equal to 25 kg/m², and patients with a first nonsubclavian vein thrombosis.

The treatment of UEDVT is a multimodal approach involving early thrombolysis, interim anticoagulation and delayed surgical decompression (in the presence of anatomical abnormalities).^{2,5}

Our patient had predisposing risk factors of repetitive arm movements due to his frequent weight lifting and preceding history of trauma. Both factors may have contributed to the formation of venous thrombus. As UEDVT is uncommon compared to lower extremity DVT, a high index of suspicion is required for diagnosis and immediate management.

Conclusion

This report aims to raise the awareness of the uncommon condition of acute UEDVT in young adults. History and examination are essential to make an accurate diagnosis and immediate treatment is recommended.

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