

## Relato de Caso

**Embolia Pulmonar – Uma Rara Associação com Trombo Flutuante da Veia Basílica Identificado pelo Ultrassom***Pulmonary Embolism in a Rare Association to a Floating Thrombus Detected by Ultrasound in the Basilic Vein at the Distal Arm*

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**RESUMO**

Um caso aparentemente simples de tromboflebite superficial da veia basílica no segmento distal do braço, após trauma, foi tratado clinicamente, mas evoluiu para embolia pulmonar. Atenção para a imagem modo B, descrevendo as características do ultrassom de um trombo flutuante, o que poderia ter alterado o manejo do paciente, minimizando os riscos de embolização.

**Descritores:** Embolia Pulmonar, Ultrassom, Tromboflebite

**SUMMARY**

An apparently simple case of superficial thrombophlebitis of the right basilic vein at the distal arm, post trauma, was treated clinically, but evolved into pulmonary embolism. Attention to the B-mode ultrasound characteristics describing a floating thrombus could have altered patient management, minimizing risks of embolization.

**Descriptors:** Pulmonary Embolism; Ultrasonics; Thrombophlebitis

**Introduction**

Pulmonary embolism following isolated basilic vein thrombosis has been reported as a rarity<sup>1</sup>. Deep vein thrombosis of the subclavian, axillary and brachial veins has been linked to high morbidity/mortality and pulmonary embolism, regardless of basilic vein thrombosis<sup>2-9</sup>. This report presents a rare case of isolated basilic vein thrombosis with emphasis on a duplex ultrasound finding of a floating thrombus as a potential risk for pulmonary embolism.

**Case report****Initial presentation**

A 53 year old male surgeon suffered a muscular trauma around the right elbow while playing with his child in a swimming pool. The subject slipped in the stairs hitting the border of the pool. The injury was restricted to the proximal forearm and distal arm. An analgesic was taken to relieve pain. A hardened, red, fibrous string was noted in the traumatized region two days later.

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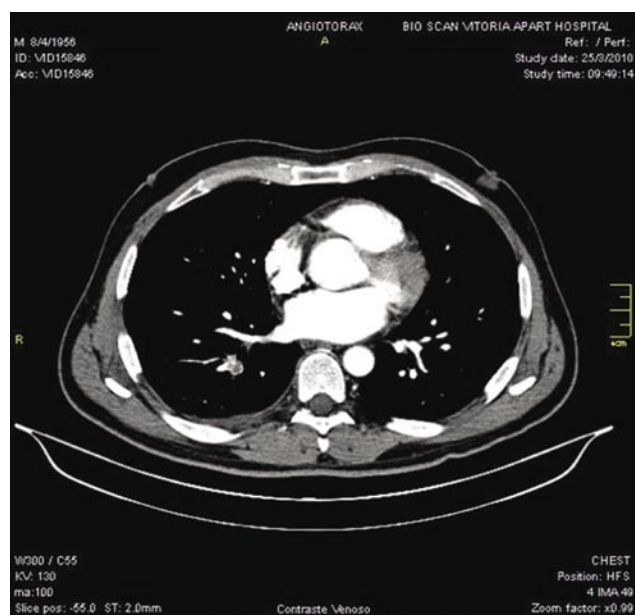
## Initial treatment

A clinical diagnosis of superficial thrombophlebitis was made and treated with an anti-inflammatory and continuation of analgesic medication.

## Complications

On the following day, the third day post-trauma, the subject felt pleuritic pain, characterized by thoracic pain on the right side that worsened with inspiration. He was admitted to a hospital where the suspected pulmonary thromboembolism was confirmed by contrast computed tomography (angio CT), Figure 1.

**Figure 1:** Angiotomography demonstrated pulmonary thromboembolism in the basal posterior and lateral segments of the right inferior lobe.



## Treatment

The patient was admitted to intensive care unit and treated with heparin.

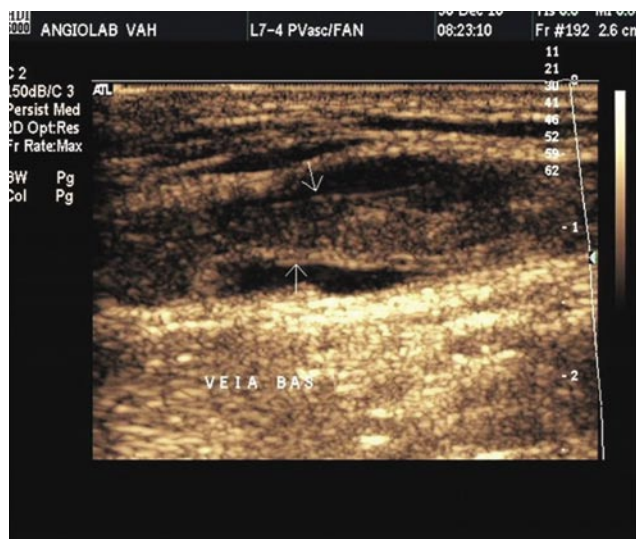
## Duplex ultrasound

Duplex Doppler ultrasound examination (US) was requested to trace a potential thrombotic source of embolization. The lower extremity US included the femoropopliteal, tibial, peroneal and muscular deep veins and superficial saphenous veins. All the lower extremity veins were compressible and patent. A pelvic-abdominal US demonstrated patency of the inferior vena cava, common and external iliac veins by color flow and duplex Do-

ppler. No thrombi were visualized in these veins. The jugular, subclavian, axillary, brachial, cephalic and basilic veins of the left upper extremity were patent. Radial and ulnar veins were small. Venous compressibility was ascertained when appropriate.

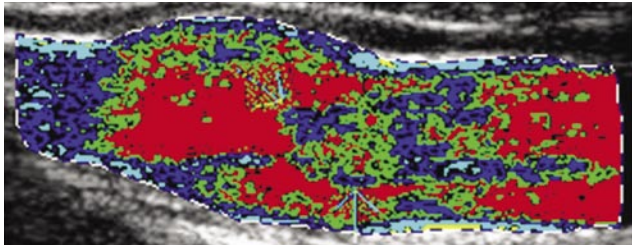
The examination of the right upper extremity started at the forearm basilic vein. US demonstrated thrombosis in a tributary leading into the basilic vein at about two inches distal to the antecubital fossa. The basilic vein around the elbow was dilated showing thrombus apparently evolving from hypoechoic to echoic in ultrasonographic appearance. The thrombus ended proximally as a floating tail not touching the basilic vein wall, Figure 2. The terminal appearance of the floating tail was not round and smooth but seemed severed, convex rather than concave, raising the suspicion of thrombus separation. A virtual histology technique applied to the B-mode image further demonstrated the tissue characteristics of thrombotic regions and possible attachment or not to the wall, Figure 3. Patency without thrombus visualization was further demonstrated at the proximal basilic, cephalic, brachial, axillary, subclavian and jugular veins of the right upper extremity.

**Figure 2:** Angiotomography demonstrated pulmonary thromboembolism in the basal posterior and lateral segments of the right inferior lobe.



Diagnosis of localized basilic vein thrombosis with floating proximal tail and perhaps thrombus separation was ascertained as probable cause of pulmonary embolization.

**Figura 3:** A virtual histology ultrasound technique applied to a B-mode image of the thrombus delineates blood in red and aging thrombus in green and blue. The arrow points to a floating thrombus with minimal attachment to the proximal wall.



## Discussion

An apparently simple case of trauma followed by superficial thrombophlebitis of the basilic vein complicated into pulmonary embolism, a rare occurrence<sup>1</sup>. Comments about trauma as etiology, extent of venous evaluation in search of sources of emboli, seriousness of upper extremity venous thrombosis, unusual cases and value of modern interpretation of duplex ultrasound findings, specifically the detection of a floating thrombus, are briefly discussed.

Search for sources of emboli included evaluation of the upper and lower extremities. It has been reported that upper extremity deep venous thrombosis (UEDVT) should raise the suspicion of lower extremity deep venous thrombosis (LEDVT)<sup>2</sup>. Furthermore, in-patients with combined UEDVT and LEDVT had increased mortality rates<sup>3</sup>. Hingorani et al.<sup>3-5</sup>, presented data revealing that UEDVT of brachial, axillary and/or subclavian veins was associated with higher morbidity/mortality compared to LEDVT. Central venous catheter, pacemaker, and malignancy were risk factors for UEDVT. UEDVT was also linked to a hypercoagulable state<sup>5</sup>. Prandoni et al<sup>6</sup> documented a high incidence of pulmonary embolism and post-thrombotic sequelae associated with UEDVT<sup>6</sup>. Prevalence of basilic vein thrombosis was less than that of subclavian vein thrombosis, being higher than the prevalence of brachial, cephalic, internal jugular, and axillary vein thrombosis. Tenderness, central venous catheter and malignancy were positive predictors. Pulmonary embolism was not, actually being described as a negative predictor.

Cases of superficial thrombosis including the basilic vein have been described: a) a patient with

severe hemophilia A had isolated basilic vein thrombosis<sup>7</sup>; b) basilic and cephalic thrombosis developed after fluorescein angiography<sup>8</sup>; and c) a basilic vein thrombosis extending into axillary and subclavian veins, concomitant with cephalic vein compression resulted from a shoulder subluxation<sup>9</sup>; and d) multiple episodes of pulmonary embolism have been ascribed to a thoracic outlet syndrome as a cause of superficial phlebitis<sup>10</sup>.

Venography was employed in the rare case of pulmonary embolism from isolated basilic vein thrombosis<sup>1</sup>. Nowadays it is expected that ultrasound would be the technique of choice. Duplex ultrasonography of the upper extremities have expanded and diversified since the 1980's<sup>11,12</sup>. Detection of thrombosis, selection of arm veins for arterial reconstruction or for dialysis fistulas have been major venous applications. True or false aneurysms, edema, lymphadenopathy, hematomas, cysts, and abscesses have also been evaluated.

This report emphasizes a particular feature of B-mode ultrasound: the ability to detect floating or moving thrombi. Detection of movement of a thrombus tail or assessment of thrombus attachment to the wall are feasible using ultrasound imaging. Attention to these details could improve risk evaluation and potential for embolization. As a suggestion for further studies, it is hypothesized that moving or non-attached thrombi present a higher risk of embolization and subsequent pulmonary embolism.

In summary, the seriousness of UEDVT has been recognized, unusual cases can cause UEDVT or superficial thrombosis, isolated basilic vein thrombosis causing pulmonary embolism is rare, and ultrasound findings of a floating, unattached thrombus should raise awareness for increased risk of embolization.

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