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VTE ought to be divided not only in DVT and PTE, but also in subacute/chronic forms[☆]



To the Editor,

In papers [1–3] and in the Guidelines [4,5], the venous thromboembolism (VTE) has for a considerably long period of time been divided into deep vein thrombosis (DVT) and into pulmonary thromboembolism (PTE). This is indeed valid for the *acute* VTE forms. As far as it is known, there have not been any different classifications of VTE in publications, including the most recent. Subacute/chronic forms (or complications, such as Post-thrombotic syndrome, Post-PTE syndrome and Chronic Thromboembolic Pulmonary Hypertension - CTPH) have usually been mentioned after the classification [4,6], if at all [2].

The residual symptoms and the signs following the acute VTE episode are not rare, belonging to the Post-thrombotic syndrome or the Post-PTE syndrome (and later to CTPH).

A) The *Post-thrombotic syndrome* occurs in around *half of the patients following DVT* and it represents any one combination of leg pain, weightiness, itching, edema (in various degrees), and even chronic leg ulcers. The incomplete resolution of thrombus in DVT is a major risk factor

for the Post-thrombotic syndrome. It sometimes occurs when the patient has not taken anticoagulation medication, but it sometimes occurs even after regular anticoagulant treatment of DVT. The Post-thrombotic syndrome decreases the quality of life in the health-related aspect (HRQoL) and increases health-care expenditure [7,8].

B) Similar to the Post-thrombotic syndrome is the “*Post-PTE syndrome*”. Based on the available evidence, approximately in *half of PTE patients* the symptoms persist and limit daily activities which diminishes HRQoL, in some cases for years to come [9,10]. Thrombi in pulmonary arteries (PA) have been reported to persist in 25–33% of PTE patients after a period of 6–12 months of an index event [10,11]. Furthermore, PA pressures can be persistently elevated, and the right ventricle may not work properly [10,11]. Consequently, the Post-PTE syndrome can be the adequate name and the explanation for the abnormalities of heart and/or lung functions, resulting in symptoms and signs thus compromising functional status and HRQoL, if there is no other obvious reason [10]. The high prevalence of Post-thrombotic and Post-PTE syndromes suggests that they should find a place in VTE classification just as is the case with acute forms. It is a sufficient reason to improve the actual dichotomous separation of VTE (in DVT and PTE only).

Obviously, there is an additional reason. The importance of differential diagnosis between relatively frequent recurrences versus subacute/chronic VTE types is the second reason to incorporate the “not-acute” forms in the VTE classification. The high rate or re-VTE has been known for decades [12,13]. Currently the guidelines cite the cumulative prevalence of VTE recurrences being as high as 13%, 23% and 30% after 1, 3 and 5 years of follow up, respectively [4]. If we perceive that VTE as an acute disease with a high recurrence rate (as it is currently believed), any suggestive symptom or sign will probably be considered as a new VTE episode. This is usually correct, but it is not always because the symptom persistence or worsening can represent (among other causes) not only the VTE recurrence but also the post-PTE syndrome. For example, dyspnea in a patient with a previous PTE—if not arising from other diseases—does not automatically mean that it is a result of a new episode of PTE. It may well be a Post-PTE syndrome.

It may be argued that Post-PTE syndrome and Post-thrombotic syndrome ought to be regarded as subacute/chronic VTE types or as complications of VTE. Their high prevalence (approximately 50% each) following acute VTE events suggests that the term “non-acute” VTE forms is appropriate. Moreover, both Post-VTE syndromes reflect the *same pathologic substrate (thrombosis) in the same organ as previous VTE*; therefore, they can be regarded as *insufficiently cured acute VTE types*, rather than complications. Furthermore, it is probably more useful for practice to recognise them as VTE forms: we have been generally more aware of types of a disease than of its’ complications. Additionally, the complications may be said to be rare and this is a potentially dangerous mistake in VTE treatment. Therefore, it would appear to be logical to separate not all, but *only the acute* VTE into DVT and PTE. The current division of VTE into DVT and PTE (although universally accepted) [1–5] is not sufficiently precise and consequently it is inadequate.

To understand that VTE ought to be viewed as a chronic disease [14], our suggestion is to classify it in the following manner: “VTE encompasses both A) acute forms (DVT and PTE) as well as B) subacute/chronic ones (Post-thrombotic syndrome, Post-PTE syndrome and CTPH).” Therefore, the sum of experts’ recommendations can be entitled “PTE Guidelines” and not “*Acute* PTE Guidelines”. Noting that VTE is not represented only by DVT and/or PTE, but also by subacute/chronic forms, we can improve at least four practical and scientific approaches: 1) The knowledge of Post-PTE syndrome can be expected to rise dramatically; 2) Increased awareness of the high prevalence of the Post-PTE syndrome would lead us to study it far more intensively (in order to improve its prevention); 3) We can better prepare future thromboprophylaxis for patients with previous VTE during risky occasions, such as prolonged immobility. It is important, particularly for patients with post-VTE syndrome(s) because their frequent residual thrombosis may represent the additional risk for re-thrombosis; and 4) We may better realize that plausible symptoms

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(e.g., dyspnea) may be not only because of a new episode of VTE, but also a “non-acute” VTE form. Consecutively, our efficacy in the ED may be improved.

Conclusion: The prevalence of Post-thrombotic and Post-PTE syndromes has been approximately 50% following DVT or PTE. Their high prevalence suggests that Post-VTE syndromes can be regarded as subacute/chronic forms rather than complications of VTE. Therefore, a suggested approach may be to separate VTE not only in two acute, but also in subacute/chronic forms (such as Post-thrombotic syndrome, Post-PTE syndrome and CTPH). This is so as to complete the classification. Moreover, it will help us to better perceive the nature of the disease. Additionally, this improved but still simple classification, can enhance our awareness of the Post-PTE syndrome, which is currently not adequate nor is it universal. Consequently, such a classification can be useful for pragmatic purposes - to increase the proper taking of, e.g., “not-acute PTE” (post-PTE syndrome and CTPH) in differential diagnosis in the ED.

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Experience with various techniques for fishhook removal in the emergency department

Fishhook injuries are a commonplace occurrence in both sportfishing and commercial fishing in Michigan. Barbed hooks with single or multiple tips and barbs are used for more success, with the barb on the front end of the hook becoming fixed in the fish's mouth. On occasion, the hook may accidentally snag the fisherman and cause hand or bodily injury. Wounds most commonly occur on the upper limbs or head [1,2]. While the external injury often seems minimal, internal injuries can be dangerous, particularly when the barbed hook is lodged near a blood vessel, tendon, or nerve [1]. Patients and their friends or relatives may try to remove the hook which can often cause more damage to the soft tissues, and many are not medically trained and do not provide appropriate wound care [1]. Generally, there are five primary techniques for fishhook removal: retrograde, string-yank, needle cover, barbed-shaft, and advance and cut [3–5]. The type of method employed depends of factors such as the type of hook, location of injury, depth of tissue penetration, and the physician's judgement [3,4] (Table 1). The purpose of this study was to describe the injury location and treatment of fishhook injuries in patients who presented to the emergency department (ED) in West Michigan.

We conducted a retrospective cohort analysis of patients presenting to the EDs of seven affiliated hospitals in West Michigan with a diagnosis of fishhook injury. All eligible cases were seen between January 2005 and July 2017 (150 months). Patient demographics, location of injury, treatment in the ED, and final disposition were recorded using standardized abstraction forms. Descriptive statistics (mean, SD) and frequency tables were used to describe the key quantitative and qualitative variables.

During the study period, 130 patients presented to the ED with an imbedded fishhook. The average age was 27.1 ± 22.3 years; age range 16 months to 71 years. The majority of patients were male (81%). Fishhooks were often barbless hooks, or had a number of barbs, ranging from a single barbed hook to a treble hook with 3 separate barbed hooks. Common locations for injury included the scalp (35%), cheek (22%), finger (19%), and ear (9%). Typically, the injury occurred on the right side of the body (63%). Fishhooks that were not deeply imbedded in the subcutaneous tissue were removed by the retrograde method (16%), gentle manipulation (8%), or cutting the hook out of the skin by making a small incision (7%). Fishhooks that were more deeply imbedded were removed using the barb-sheath method (7%), advance-and-cut method (32%), string-pull technique (22%), or the barbed-shaft hook removal process (8%). Fifteen patients (11%) required more than one technique to remove the fishhook. Overall, 71% of patients required local anesthesia or digital block (4%); two children required conscious sedation. Nineteen patients (15%) were discharged on prophylactic antibiotics.

Results of this study suggest that most fishhook injuries involve the head or neck. Local anesthetics and simple removal techniques are adequate for nearly all injuries. With injuries that are superficial, the retrograde and string-yank methods should be the initial methods of choice as these methods inflict minimal amounts of additional trauma [4]. However, with deeper tissue infiltration, or hooks with barbed shafts, these methods may prove impossible to complete. An advantage of using the barbed-shaft removal and advance and cut techniques for deeper injuries is that they are nearly always successful even though they may inflict more trauma [4]. The methods employed in this study are not intensive and do not require tools which are not generally readily available in the ED. Choosing which technique to use depends on the type of fishhook, the location and depth at which the hook has become embedded in the patient's skin, and the treating physician's judgement. Prophylactic antibiotics may be warranted for patients suffering from deeper wounds which may involve tendons, cartilage or bone [4]. To lessen the chance of serious fishhook injuries, the use of barb guards during storage or non-barbed hooks are alternatives one can utilize.

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