

Letter to the Editor

VENOUS THROMBOEMBOLISM (VTE) OUGHT TO BE DIVIDED INTO DEEP VEIN THROMBOSIS (DVT) AND PULMONARY THROMBOEMBOLISM (PTE), NOT PULMONARY EMBOLISM (PE)

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Abstract. *Venous thromboembolism (VTE), which includes deep vein thrombosis (DVT) and pulmonary thromboembolism (PTE), represents a significant healthcare burden worldwide. Different aspects of clinical conditions underlying different types of embolization are discussed in order to overcome the controversy over current names for these conditions. Therefore, we suggest that venous thromboembolism (VTE) ought to be divided into deep vein thrombosis (DVT) and pulmonary thromboembolism (PTE), not pulmonary embolism (PE).*

Key words: *venous thromboembolism, deep vein thrombosis, pulmonary thromboembolism, pulmonary embolism.*

Introduction

In non-thrombotic pulmonary embolism (“PE”) there are various materials that can embolize to pulmonary arteries, such as septic (bacteria, parasites, fungi), foreign-material (e.g., silicone, broken parts of vena cava filters), fat (found in the majority of patients who have long bone / pelvic fractures or in some patients with knee / hip prostheses implantation), air (e.g., from central venous catheters, trauma, surgery), amniotic fluid (during normal labor/trauma or surgery of the uterus), or tumor cells (from carcinoma of the prostate, liver or breast, etc) [1-7].

Clinical conditions underlying different types of embolization are type-specific; for example, the labor for amniotic fluid embolism, the bone fracture/operation for fat embolism, venous cannulation for air embolism, sepsis (e.g., in right-sided infective endocarditis) or spontaneous for tumor embolism [1, 2, 8]. Even veins from which emboli stem are not the same: e.g., thrombi that embolize are usually formed in deep leg veins, while in the case of air embolism, air enters the circulation in e.g., jugular vein [1, 2]. Treatment is different, too. Fat emboli are often treated using glucocorticoids [1], septic emboli using antibiotics, etc. Therefore, other embolizations to the pulmonary artery are quite different from the thrombotic type. Consequently, the main point of this paper is the fact that when something embolizes from deep vein thrombosis, it is a thrombus (and not air), which arrives in the pulmonary artery, resulting in pulmonary thromboembolism.

The second reason for the recommendation to improve the name from “pulmonary embolism” to “pulmonary thromboembolism” is the fact that the latter is more precise and specific (and this is an important requirement in medicine). An additional reason is that venous thromboembolism (VTE) consists of deep vein thrombosis (DVT) and pulmonary thromboembolism (PTE), so how can VTE integrate DVT and, e.g. fat embolism? Simply in VTE, there is no place for other types of emboli in addition to thromboemboli. The fourth reason is that the vast majority of “PE” is thrombotic in nature (since it is PTE); up to 90% of “PE” arises from leg DVT [6]. Consequently, the name ought to be PTE and not “PE”. The dividing of VTE in DVT and PTE is natural and encompassed, complete.

In this direction, in the 2019 guidelines for “PE” of the European Society of Cardiology (ESC) it is stated that VTE presents clinically as DVT or “PE”, but other types of emboli are not mentioned [9] which is an improvement from the previous version [1]. Moreover, this acronym (PTE) is less likely to be misinterpreted as compared to “PE”. It is difficult to answer where the part “thrombo” has gone from its place (the word thromboembolism) and why it disappeared. One cannot figure out any obvious reason to mix thrombotic and non-thrombotic events (and diseases) under the diagnosis VTE. Let us put it simply: VTE consists of DVT and PTE (not “PE”), and PTE is the term to be preferred in papers and guidelines; other types of pulmonary emboli either have no place in guidelines on PTE (or may be described as differential diagnosis).

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Conclusion

When DVT embolizes, it is thrombus that travels (i.e., embolus), not fat, not air, not a tumor, not amniotic fluid, etc., and it necessarily results in thromboembolism, i.e. in pulmonary thromboembolism (PTE). On the other hand, air, fat, tumor, etc. embolizations are very different processes (from etiologic, pathogenic, diagnostic and therapeutic stand-points) and represent differential diagnosis to PTE. VTE

simply cannot consist of DVT and other types of pulmonary emboli, but thromboemboli; therefore PTE is a correct name and ought to be preferred to “PE”.

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References

1. Konstantinides SV, Torbicki A, Agnelli, et al. Task Force for the Diagnosis and Management of Acute Pulmonary Embolism of the European Society of Cardiology (ESC). 2014 ESC guidelines on the diagnosis and management of acute pulmonary embolism. *Eur Heart J* 2014; 35:3033–69, 3069a–3069k.
2. Ufuk F, Kaya F, Sagtas E, Kupeli A. Non-thrombotic pulmonary embolism in emergency CT. *Emerg Radiol* 2020; 27:343–50.
3. Moningi S, Kulkarni D, Bhattacharjee S. Coagulopathy following venous air embolism: a disastrous consequence -a case report-. *Korean J Anesthesiol* 2013; 65(4):349–52.
4. Souders JE. Pulmonary air embolism. *J Clin Monit* 2000; 16:375–83.
5. Bajc M, Schümichen C, Grüning T, et al. EANM guideline for ventilation/perfusion single-photon emission computed tomography (SPECT) for diagnosis of pulmonary embolism and beyond. *Eur J Nucl Med Mol Imaging* 2019; 46:2429–51.
6. Giordano NJ, Jansson PS, Young MN, Hagan KA, Kabrhel C. Epidemiology, Pathophysiology, Stratification, and Natural History of Pulmonary Embolism. *Tech Vasc Interv Radiol* 2017; 20:135–140.
7. Truhlar A, Cerny V, Dostal P, et al. Out-of-hospital cardiac arrest from air embolism during sexual intercourse: case report and review of the literature. *Resuscitation* 2007; 73:475–84.
8. Lari A, Abdulshakoor A, Zogheib E, et al. How to Save a Life From Macroscopic Fat Embolism: A Narrative Review of Treatment Options. *Aesthet Surg J* 2020; 40:1098–107.
9. Konstantinides SV, Meyer G, Becattini C, et al.; The Task Force for the diagnosis and management of acute pulmonary embolism of the European Society of Cardiology (ESC). 2019 ESC Guidelines for the diagnosis and management of acute pulmonary embolism developed in collaboration with the European Respiratory Society (ERS): The Task Force for the diagnosis and management of acute pulmonary embolism of the European Society of Cardiology (ESC). *Eur Respir J* 2019; 54:1901647.