



Challenges in the management of patients with pulmonary embolism in Brazil

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Pulmonary thromboembolism (PTE) is a disease that has a high annual incidence (29-78 new cases per 100,000 person-years),⁽¹⁾ having ranked third among the leading causes of cardiovascular death in the last three decades.⁽²⁾ Therefore, it is important to understand the economic impact of PTE and the factors involved in its prognosis. In the current issue of the *Jornal Brasileiro de Pneumologia* (JBP), an epidemiological study shows relevant data on the number of hospitalizations for PTE, costs of PTE treatment, and mortality of PTE in the five regions of Brazil.⁽³⁾

The risk of PTE increases with age, as does the risk of common aging-related comorbidities such as cardiovascular disease, chronic lung disease, and cancer.^(4,5) Aging and age-related comorbidities contribute to increased length of hospital stay, costs, and risk of morbidity and mortality from thromboembolic events.⁽⁴⁾ Given the increase in life expectancy in recent decades, with the aging rate in Brazil having increased by 268% from 1970 to 2010, particularly in the southern and southeastern regions of the country,⁽⁶⁾ the number of hospital admissions for PTE has increased: the mean number of hospitalizations was 2.57/100,000 population in 2008 and 4.44/100,000 population in 2019.⁽³⁾

In countries in which there are major differences across regions, including high social inequality, widespread poverty, and limited access to health care, it can be assumed that delayed care results in poorer clinical status. These factors, together with inappropriate or inadequate home care after discharge, can lead to increased hospital stays, increased costs, and worse prognosis.⁽⁷⁾ In recent years, new technologies have been developed for the diagnosis and treatment of PTE, contributing to an increase in hospital costs in Brazil and worldwide.^(3,4) Although these new technologies can have a positive impact on patient management, they entail an increase in health care costs.^(3,4)

For decades, initial anticoagulation therapy was performed in hospitals, even in cases in which the risk of morbidity and mortality was low, because of the need

to transition from anticoagulation with unfractionated heparin or low-molecular-weight heparin to coumarins. In recent years, with the emergence of oral medications that dispense with this transition and the need for periodic control of the effect, shorter hospital stays and even initial home treatment have begun to be studied as alternatives to prolonged hospitalizations, although the safety of these strategies has yet to be confirmed.⁽⁸⁻¹⁰⁾ In addition, these therapeutic alternatives have yet to be incorporated into the Brazilian Unified Health Care System at the national level. Furthermore, logistical difficulties in gaining access to health care facilities constitute a barrier to early hospital discharge in socioeconomically disadvantaged populations.^(2,3)

In Brazil, hospital stays for PTE are still long, having remained practically unchanged in recent years. In 2008, the mean length of stay was 9.1 days; in 2019, it was 8.7 days. However, there was a trend toward a reduction in in-hospital mortality (which was 21.21% in 2008 and 17.1% in 2019). Nevertheless, this reduction was more pronounced in the southern and southeastern regions of the country; in-hospital mortality remained highest in northeastern Brazil (25.1%), evidencing the impact that socioeconomic inequalities have on the delivery of health care in Brazil.⁽³⁾

Epidemiological studies, such as the one published in this issue of the JBP,⁽³⁾ provide a better understanding of the problems related to the delivery of health care, as well as informing public policies to improve the quality and cost-effectiveness of health care.

AUTHOR CONTRIBUTIONS

Both authors contributed equally to the conceptualization and critical analysis of the manuscript, having written, reviewed, revised, and approved it for submission.

CONFLICTS OF INTEREST

None declared.

REFERENCES

1. Heit JA. Epidemiology of venous thromboembolism. *Nat Rev Cardiol.* 2015;12(8):464-474. <https://doi.org/10.1038/nrcardio.2015.83>
2. Martin KA, Molsberry R, Cuttica MJ, Desai KR, Schimmel DR, Khan SS. Time Trends in Pulmonary Embolism Mortality Rates in the United States, 1999 to 2018. *J Am Heart Assoc.* 2020;9(17):e016784. <https://doi.org/10.1161/JAHA.120.016784>
3. Gomes JA, Barros JEB, Nascimento ALOD, Rocha CAO, Almeida JPO, Santana GBA, et al. Hospitalizations for pulmonary embolism in Brazil (2008-2019): an ecological and time series study. *J Bras Pneumol.* 2022;48(3):e20210434.

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4. Pauley E, Orgel R, Rossi JS, Strassle PD. Age-Stratified National Trends in Pulmonary Embolism Admissions. *Chest*. 2019;156(4):733-742. <https://doi.org/10.1016/j.chest.2019.05.021>
5. Carneiro RM, van Bellen B, Santana PRP, Gomes ACP. Prevalência de tromboembolismo pulmonar incidental em pacientes oncológicos: análise retrospectiva em grande centro. *J Vasc Bras*. 2017;16(3):232-238. <https://doi.org/10.1590/1677-5449.002117>
6. Closs VE, Schwanke CHA. Aging index development in Brazil, regions, and federative units from 1970 to 2010. *Rev Bras Geriatr Gerontol*. 2010;15(3):443-458. <https://doi.org/10.1590/S1809-98232012000300006>
7. Andrade MV, Noronha KVMS, Menezes RM, Souza MN, Reis CB, Martins DR, et al. Desigualdade socioeconômica no acesso aos serviços de saúde no Brasil: Um estudo comparativo entre as regiões brasileiras em 1998 e 2008. *Econ Apl*. 2013;17(4):623-645. <https://doi.org/10.1590/S1413-80502013000400005>
8. Fernandes CJ, Alves Júnior JL, Gavilanes F, Prada LF, Morinaga LK, Souza R. New anticoagulants for the treatment of venous thromboembolism. *J Bras Pneumol*. 2016;42(2):146-154. <https://doi.org/10.1590/S1806-37562016042020068>
9. Yoo HH, Nunes-Nogueira VS, Fortes Villas Boas PJ, Broderick C. Outpatient versus inpatient treatment for acute pulmonary embolism. *Cochrane Database Syst Rev*. 2019;3(3):CD010019. <https://doi.org/10.1002/14651858.CD010019.pub3>
10. Kohn CG, Fermann GJ, Peacock WF, Wells PS, Baugh CW, Ashton V, et al. Association between rivaroxaban use and length of hospital stay, treatment costs and early outcomes in patients with pulmonary embolism: a systematic review of real-world studies. *Curr Med Res Opin*. 2017;33(9):1697-1703. <https://doi.org/10.1080/03007995.2017.1349659>