

Venous Thromboembolism Mortality Profile between 2010 and 2020 in the State Of Bahia

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Abstract

Context: Venous Thromboembolism is the leading cause of preventable hospital death Objectives: To trace the mortality profile of Venous Thromboembolism in Bahia between 2010 and 2020.

Methods: This is an observational and descriptive study of the historical series that uses data Secondary information originating from the Mortality System (SIM), developed by DataSUS, associated with quantitative analysis.

Results: A total of 3,317 reports of Venous Thromboembolism were found, being 55.98% female and 43.9% male. There was a predominance of the number of deaths in the East Macro-region. The self-declared brown population was the most affected in all macro-regions, with 54.83% of notifications. The age group with the most death notifications was 80 years or older, with 29% of cases.

Conclusion: The mortality profile found was the female population, aged 80 years or older, brown and located in the East macro-region.

Keywords: Venous thromembolism; Mortality; Bahia; Deaths, DataSUS

Introduction

Venous Thromboembolism (VTE) is a vascular disease characterized by the formation of a clot in a deep vein, which, according to studies report, the thrombus is fixed to the vessel walls by fibrin, along with platelets, configuring Deep Vein Thrombosis (DVT). In the case of Pulmonary Thromboembolism (PTE), this clot, or part of it, may undergo embolization and reach the lungs, with possible partial or total occlusion of a pulmonary artery. Thus, the VTE is constituted by both conditions [1, 2]

In 1814, Rudolf Virchow assigned as the main etiologies of this pathology a triad named in his honor, the Virchow Triad [3], whose components are:

- 1) blood hypercoagulability – resulting from genetic or acquired factors responsible for the exacerbated activation of the coagulation cascade, or the lack of anticoagulant components;
- 2) venous stasis – greater interaction between clotting factors and the

endothelium, which increases the risk of thrombosis; and

3) endothelial injury – exposure of the endothelial matrix and collagen, which also stimulates the coagulation cascade. Any of the three altered factors associated with risk factors, such as advanced age or congestive heart failure, increases the probability of DVT or PTE [4]. Although VTE is formed by two conditions with complementary pathophysiology, the site of involvement and, consequently, the clinical manifestations, when present, are different [5, 6].

DVT, in turn, results from involvement of peripheral splanchnic and cerebral veins, as well as those of the upper and, mainly, lower limbs. In the latter case, due to venous obstruction, the clinical picture is characterized by phlogistic signs of vessel inflammation, such as pain, redness, tense-type unilateral edema and heat. The pain can be permanent or associated with orthostasis and physical exertion, which can be explored in the physical examination by dorsiflexion of the foot to assess the presence of Homans Sign, severe pain in the calf secondary to the described maneuver. In addition, unilateral edema, sensitivity to palpation of the affected limb and prominent superficial circulation may be present, in addition to cyanosis, a less common sign of DVT, resulting from impaired perfusion [7].

As a possible evolution of the explained condition, patients with PTE present cardiorespiratory signs and symptoms, such as dyspnea, tachycardia, hypoxemia, hemoptysis and chest pain, which vary according to time, clot size, caliber of occluded vessel and number of emboli. Given the lack of specificity of the clinical findings, the diagnosis is made with the aid of the Wells Score, which scores according to the presence of signs and symptoms of DVT, less likely differential diagnosis, tachycardia, immobilization or surgery in the last 4 weeks, previous episode of DVT or PTE, hemoptysis and cancer [8, 9, 10]. VTE, therefore, is highly severe given its variety of presentations and its silent profile in patients who trigger a sudden condition [11]. Thus, it is extremely important that the diagnosis be made as early as possible so as not to aggravate the patient's situation [12].

Considering these clinical manifestations and Virchow's Triad, the risk factors for VTE are divided into unprovoked and provoked. The first group is related to coagulation events without environmental risk, such as gender, advanced age and hereditary thrombophilias. On the other hand, in the second group there is an associated environmental risk factor, such as previous surgeries, use of central venous catheters and congestive heart failure.

Epidemiological data regarding VTE are not very precise, since the underreporting of this disease faces the low specificity of signs and symptoms, as well as the rare performance of autopsies to define the cause-of-death. However, certain studies seek to estimate an epidemiological profile of this disease, especially mortality, a health indicator that reveals the number of deaths from a cause in a given period, place and population.

Many studies and protocols have been proposed as a way to establish prophylactic therapies in an attempt to reduce the mortality rate of VTE, which is the first cause of preventable hospital death. However, establishing and implementing these programs, and consequently reducing VTE mortality, comes up against the participation of hospital institutions and the need to promote continuing education for health professionals [13].

In the pandemic context, there was an increase in the number of cases of VTE and PE, in addition to the association of their appearances with the most severe cases of patients infected with SARS-CoV-2. Recent studies seek to elucidate the magnitude of this growth and investigate the relationship between COVID-19 infection and the formation of thrombotic events. Searching

for findings based on Virchow's Triad in these patients: 1) hypercoagulability due to the increase in pro-inflammatory cytokines caused by the infection; 2) venous stasis due to the low mobility of these patients, especially those who were hospitalized and 3) endothelial damage caused by the interaction of the virus with the capillary membrane.

In the reality of Brazil, a country with a large territorial extension, population contingent and health inequalities, it is imperative to recognize the mortality of patients affected by VTE according to the state and municipal context, due to the distribution of technical, scientific-informational capital and, consequently, the quality of the assistance network available. Thus, this work aims to demonstrate the data obtained on VTE mortality in the territory of the state of Bahia between the years 2010 and 2020 from the perspective of the socioeconomic and demographic profile of the patients.

Objectives

Primary objective: to describe the mortality profile of patients who died due to venous thromboembolism in the state of Bahia between 2010 and 2020.

Secondary objectives: to describe the demographic characteristics of the patients and the temporal trend of the frequency with which venous thromboembolism contributed to the total number of deaths by the Unified Health System in the place and period studied.

Methodology

This is an observational and descriptive study of the historical series that uses secondary data from the Mortality Information System (SIM), developed by Data-SUS, associated with quantitative analysis.

Place and period of study

Data from patients suffering from Venous Thromboembolism hospitalized by the Unified Health System in the state of Bahia were incorporated into Microsoft Excel software according to the selected historical period associated with the ICD-10 codes: I26 Pulmonary Embolism and I82 Other Embolism and Venous Thrombosis. This data can be verified through the TabNet portal, at the following access link: <https://datasus.saude.gov.br>

Variables

In order to explore the mortality of Venous Thromboembolism according to the region of occurrence, the variables used were the annual frequency, race/color (white, black, brown, yellow, brown and indigenous), biological sex (male or female), age range (28 days to 29 years, 30 to 39 years, 40 to 49 years, 50 to 59 years, 60 to 69 years, 70 to 79 years and 80 years and over). The health macro-regions of the state of Bahia (North, Central-North, Northeast, East, Central-East, West, Southwest, South and Extreme-South) were also evaluated.

Data analysis plan

Microsoft Excel software was used to, in addition to building the database, analyze it based on graph synthesis. Regarding the descriptive analysis, the categorical variables were expressed through the distribution of simple and relative frequencies.

Ethical aspects

Since it is based on data made publicly available by SIM in accordance with Resolution No. 466/2012, this work does not require submission to the Research Ethics Committee.

Results

Between the years 2010 and 2020 in Bahia, a total of 3,317 were reported due to Venous Thromboembolism, including Pulmonary Embolism (I26) and Other Embolisms and Venous Thromboses (I82). Thus, the behavior of the curve between 2010 and 2015 was upward from 207 to 351, with a slight drop in 2016 to 348 cases. The curve then maintained the growth pattern, reaching the peak of the period in 2019 with 382 deaths, followed by a drop in 2020 to 357.

Figure 1 reveals that the Macro-Region 2915 East (NRS – SALVADOR) had the highest number of deaths, with a total of 1435 (43.26%), followed by the

Macro-regions 2911 Sudoeste (NBS – VITÓRIA DA CONQUISTA), with 408 (12.3 %), 2917 Central-East (NRS – FEIRA DE SANTANA), with 364 (10.97%) and 2910 South (NBS - ILHÉUS) with 360 (10.87%).

During the study period and place, there was a slight predominance of deaths in females (55.98%), with a total of 1,857 cases, while males had 1,456 (43.9%). Macro region 2915 East (NRS - Salvador) concentrated the highest number of deaths, with 582 men (40.55%) and 851 women (59.30%); only 2 cases had unknown sex. Regarding the total number of male and female deaths between 2010 and 2020, the region leads with 39.97% and 45.82%, respectively.

With regard to the race/color criterion, the self-declared brown population was the most affected in all macro-regions, with an absolute number of 1,819 deaths (54.83%). The self-declared white population had 758 deaths, and 239 cases were ignored (7.20%) in the period.

For the analysis of the number of deaths due to pulmonary embolism, venous thromboembolism and other embolisms, according to age groups, the following age intervals were analyzed: 28 days-29 years, 30-34 years, 35-39 years, 40- 44 years old, 45-49 years old, 50-54 years old, 55-59 years old, 60-64 years old, 65-69 years old, 70-74 years old, 75-79 years old, 80 years old and over, plus values associated with unknown ages. In the analyzed time interval, it was noticed that the highest number of deaths was concentrated in the population aged 80 years or more, representing a total of 943 deaths (29%), followed by the age group of 75-79 years, with 334 deaths (10%), and 65-69 years old, with 296 deaths (9%). During the period from 2010 to 2020, the number of deaths registered in which age was ignored represented approximately 0.33%, in relation to the other categories.

In view of the analysis of the number of deaths carried out in this time frame, an average of deaths per year of 301.54 deaths per year can be established. Regarding the mortality values for each year, the lowest value found was 207 deaths (6.24%) for the year 2010, while the highest value found was 382 deaths (11.51%) seen in 2019. There was an upward curve between 2010 and 2015, followed by a period of relative decline in 2016, 2017 and 2020.

Discussion

The present study traced the epidemiological profile of deaths in the state of Bahia between 2010 and 2020. The number of deaths over the period remained relatively stable, with an upward trend.

From the distribution of deaths due to Venous Thromboembolism, in the period studied, there was no variation regarding the predominance of females in these cases. The years 2010 and 2011 were the ones with the closest values between the two sexes, while the years 2013 and 2016 were the ones with the most distant values.

During data collection, the values referring to the age groups from 28 days to 29 years were grouped into just one category, with the aim of comparing with the other age ranges, given the lesser relevance of mortality in the lower age groups. According to the data presented, the number of deaths notably higher in people aged 80 years and over (29%) stands out in relation to the other patients. There was also a growing pattern in the number of deaths between the 30-34 years old and 80 years old and over age groups, except for the 40-44 and 45-50 years old categories, with a reduction of 1 death, as well as the aged 65-69 years and 70-74 years, with a reduction of 26 deaths.

Venous thromboembolism is a multifactorial disease and therefore encompasses several risk factors such as underlying diseases and lifestyle habits, but it is important to highlight that the analysis of prognosis, treatment and lethality depends on the origin of the condition that may be due to a risk factor transient (surgery or trauma) or unprovoked risk factor. Therefore, some limitations of this study are associated with the type of data provided by the DataSUS platform, lacking information, such as history of previous surgery and clinical specificities.

Conclusion

Venous Thromboembolism, therefore, is highly severe and has a silent course in certain patients.¹⁹ In the selected time interval, the profile of the investigated Bahian population demonstrates a preferential outcome of deaths in the female population, aged 80 years or older, brown, and located in the East macro-region. Furthermore, the data used are not restricted

to the resident population, which prevents the calculation of the incidence and mortality rates. Thus, as VTE is a pathology that includes pulmonary embolism and venous thrombosis, there are limitations on the data obtained, since it was not possible to investigate this information separately.

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