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Immunohematology and Thrombosis: A Review

Sebastião David Santos-Filho*

Doctor in Health Sciences, Universidade Federal do Rio Grande do Norte, Brazil

Abstract

Thrombosis occurs when blood clots block the blood vessels. Venous thrombosis may be caused by any factors as disease or injury of the leg veins, a broken bone (fracture), obesity, autoimmune disorders, between other causes. The disturb is diagnosed by tests including ultrasound, blood tests, venography, or image procedures. Portal Vein Thrombosis (PVT) with incidence estimated at 2 to 4 cases per 100,000 inhabitants, and it is common in patients with cirrhosis and is associated to the severity liver diseases. The objective of this review is to analyze the immunology of PVT, its relationship with thrombosis, and the optimal medical therapy, with a goal on answering open questions about the best management of this problem. The research covered the last 5 years with the terms Immunotherapy and Thrombosis to search for free published articles on PubMed site. It was founded 9 articles that are the scope of this review. The presentation of the conclusions of some articles obtained in the research done made us to see the need of more studies to present more solutions to this vascular disturb. Asking for my researches in this field to elucidate the mechanisms of the formation this vascular disease to present more ways of treatment or accuracy diagnostic.

Keywords: Immunohematology; Thrombosis; Venous thrombosis; Diagnostic; Treatment; PubMed

Introduction

According Johns Hopkins Medicine (https://www.hopkinsmedicine.org/) thrombosis occurs when blood clots block the blood vessels. There are 2 main types of thrombosis: venous and arterial thrombosis. Venous thrombosis may be caused by any factors as disease or injury of the leg veins, a broken bone (fracture), and obesity, autoimmune disorders, between other causes. Risk factors for venous thrombosis may include: hormone therapy, pregnancy, inherited blood clotting disorders, smoking and older age. The disturb is diagnosed by tests including ultrasound, blood tests, venography, or image procedures. The treatment of this disturb includes the use of anticoagulants, catheters to widen the affected vessels, stents, and medicine to dissolve blood clots. The more serious problems provoke by thrombosis include stroke, heart attack and breathing occurrences.

Thrombosis, or as is named in clinics, Portal Vein Thrombosis (PVT) can be a blood disturb of some conditions (chronic liver diseases, local or systemic inflammatory diseases, and neoplasms).[1] More generally, it including

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***Corresponding author:** Sebastião David Santos-Filho, Doctor in Health Sciences, Universidade Federal do Rio Grande do Norte, Brazil

thrombosis in the splenic vein, mesenteric vein, portal vein, or hepatic vein; PVT is the most common condition of venous thrombosis.[2] (Table 1) shows classification of different types of thrombosis and their features.

PVT with incidence estimated at 2 to 4 cases per 100,000 inhabitants. PVT is common in patients with cirrhosis (almost 8% according to some researches) and is associated to the severity liver diseases, reflected by incidences of ascites, muscle wasting, presence of large varices, severe hypersplenism, and Child–Pugh class C.[3-5]

PVT has been observed as a benign and self-limiting disease; but some cases are possible, such as Pulmonary Embolism (PE).[6-8] The objective of this review is to analyse the immunology of PVT, its relationship with thrombosis, and the optimal medical therapy, with a goal on answering open questions about the best management of this problem.

Table 1: Portal vein thrombosis classifications.

Type of Classification	Features
PVT site	Type 1: only trunk
	Type 2: only branch: 2A one branch and 2B both branches
	Type 3: trunk and branches
Portal venous system occlusion	OCCLUSIVE: no flow in PV lumen
	NON OCCLUSIVE: flow visible in PV lumen
Duration and presentation	RECENT: first time detected in previous patent PV, presence of hyperdense thrombus on imaging, absent or limited collateral circulation, dilated PV at the site of occlusion -asymptomatic -symptomatic CHRONIC: no hyperdense thrombus; previously diagnosed PVT on follow up, portal cavernoma -asymptomatic -symptomatic: portal hypertension

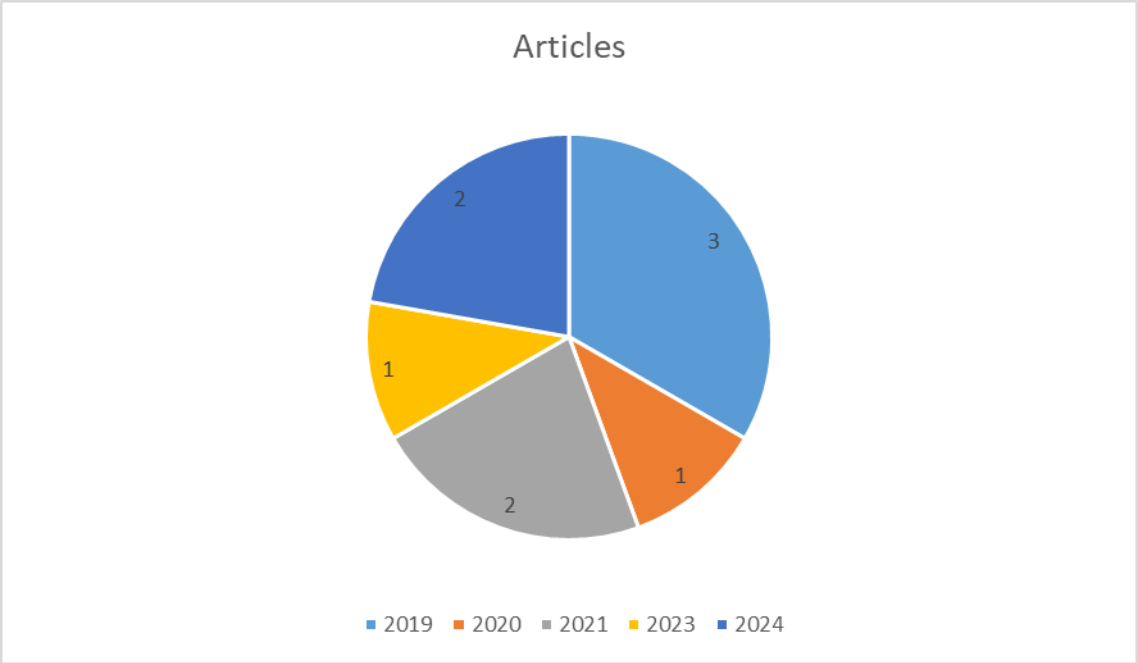
(Modified of Boccatonda et al, 2024)

Methodology

The research covered the last 5 years with the terms Immunotherapy and Thrombosis to search for free published articles on PubMed site (https://pubmed.ncbi.nlm.nih.gov/).

Results

It was founded 9 articles that are the scope of this review. All the results are showed in the following tables and graphics. The first article was a written about thrombocytopenia.[9] Hernandez and Shapiro in their articles presented consequences to haemophilia. Pengo et al. [10] described the relationship between Rivaroxaban and TRAPS. The two published in 2021 researched about haemophilia. Mangliafico et al. [13] was a review about superficial venous thrombosis, and finally, Boccatonda et al. [1] and Saposnik et al. [14], both in 2024 written about Thrombosis different types.



Observation: No articles about this theme were published in 2022.

Discussion

It seems that in thrombocytopenic patients occur the presence of albuminuria associated with a bleeding phenotype and platelet consumption presuppose those patients what develops a clinically significant bleeding require additional platelet transfusion to support alternative strategies with antifibrinolytic agents.[9] Also, a tendency of hyperglycemia in frail adults (Hernandez 2019).

Although some data suggest that the rate of recurrent thrombosis is lower in APS (Anti Phospholipid Syndrome) patients with isolated venous manifestations than in overall APS patients including high-risk patients, 24 studies on APS patients with a homogeneous aPL (antiphospholipid) profile are warranted to answer to patient preference to switch from warfarin to DOACs. In our view, this should be considered with caution only in patients with a non-triple-positive aPL profile.[10]

Callaghan et al. [11] presented data includes the previously reported 3 thrombotic microangiopathies and 2 thromboembolic events, all associated with activated prothrombin complex concentrate use, as well as, myocardial infarction and venous device occlusion. The prevalence of thrombophilic events detected in patient's exams was lower than expected given the results of prior studies, probably because of the rather low number of patients tested and their median old age.[12]

A prompt clinical and ultrasound evaluation allows for the setup of an appropriate therapy that, in the case of vein thrombosis with an extension greater than 5 cm and adequately distant from the deep circle, consists of a six-week treatment with 2.5 mg of fondaparinux mg daily.[13] Also, the use of anticoagulants, endovascular therapies and craniectomy to treat the disease were proposed.[14]

The treatment with anticoagulant therapy favours the reduction of portal hypertension, and this allows for a decrease in the risk of bleeding, especially in patients with oesophageal varices. The anticoagulant treatment is generally recommended for at least three to six months. Prosecution of anticoagulation is advised until

recanalization or lifelong if the patient has an underlying permanent pro-coagulant condition that cannot be corrected or if there is thrombosis extending to the mesenteric veins.[1]

Other studies are necessary to develop strategies with diagnose and treatment of vein thrombosis.

Conclusion

The presentation of the conclusions of some articles obtained in the research done made us to see the need of more studies to present more solutions to this vascular disturb. Asking for my researches in this field to elucidate the mechanisms of the formation this vascular disease to present more ways of treatment or accuracy diagnostic.

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