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Opinion Article

Comparison of Apixaban versus Rivaroxaban in Patients with Deep Vein Thrombosis, Pulmonary Embolism, and Recurrent Thromboembolism

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Summary

In this study, my personal opinion is presented from a relatively small group of 100 patients at the general hospital of Rhodes in the vascular surgery department which shows the results of the use of apixaban and rivaroxaban were statistically compared with their possible side effects.

Introduction

The purpose of my study is to publish a small clinical study carried out in the vascular surgery department of the general hospital of Rhodes. It was about the comparison of the results of apixaban against rivaroxaban regarding pulmonary embolism due to thromboembolism, gastrointestinal bleeding and intracranial bleeding.

Materials and Methods

The aim and scope for my study is the recording of possible complications such as thromboembolism-pulmonary embolism, gastrointestinal bleeding and the intracranial bleeding at the general hospital of Rhodes and I compare it with certain well-known published studies such as the study of University of Pennsylvania, Maastricht University Medical Center, Amlify study, Einstein study, Caravaggio study and a study which have been done by the US Commercial Security Database.

Thrombosis is defined as the formation of a blood clot (clot) within a blood vessel (vein, artery) resulting from the adhesion of the shaped components of the blood. This specific mechanism is triggered whenever there is an exogenous vascular trauma and is a protection of the body against bleeding. On the contrary, when thrombus formation occurs intravascularly, it hides a pathological process.

Intravascular thrombus (venous or arterial) causes occlusion of the vessel and disruption of normal blood circulation, endangering the viability of the organ or limb. The formed clot can break off and cause an embolism, i.e. blockage in another area. A typical example is deep vein thrombosis of the lower extremities in which a thrombus can become dislodged and cause pulmonary embolism, a condition with high mortality and morbidity. The pathophysiology [1] of thrombosis is created by three factors known as Virchow's triad-reduced and stagnant flow blood, endothelial injury and hypercoagulable blood conditions.

Venous thromboses occur mainly in the lower extremities at a rate of 70% and by 30% in the upper extremities with a slight predominance of deep venous thrombosis over superficial venous thrombosis.

Clinical signs of deep vein thrombosis include contralateral swelling, pain, warmth, and gastrocnemius tenderness on dorsiflexion of the leg (Homman's sign). Pulmonary embolism may present with chest pain, dyspnea, tachycardia, hemoptysis, hypotension, and more and syncope. Its diagnosis is made clinically and laboratory (pulmonary artery angiography, perfusion scintigraphy, d-dimers, blood gases, chest x-ray, ECG and heart ultrasound).

Pulmonary embolism is a potentially fatal condition and its diagnosis and treatment must be done correctly.

The administration of DOACS is now fully integrated into daily clinical practice as an alternative and effective method to the long-known administration of vitamin K antagonists for the treatment of recurrent thromboembolism and deep vein thrombosis. Their rapid emergence prompted many physicians to abandon the traditional method and adopt new practices and

monitoring the results of DOACS. The most widely known of this class are apixaban and rivaroxaban. There are various conflicting opinions about which active substance has a better effect. But it is not only that, it is important to investigate even the least possible complications of these active substances such as recurrent thromboembolism-pulmonary embolism, gastrointestinal bleeding, intracranial bleeding and mortality.

Thromboembolism includes pulmonary embolism and deep vein thrombosis [2]. The first estimated incidence of thromboembolism was 0.7-1.4%/1000 patients per year and the majority of them are over 55 years of age. In recent years due to the development of more accurate diagnostic methods, the rate is constantly rising as well as hospitalizations of patients with deep vein thrombosis in hospitals.

According to a study done by the US Commercial Security Database [3] from 01/01/ 2015 to 30/06/ 2020 the results concerned the treatment of deep vein thrombosis as well as the accompanying pulmonary embolism as well as their possible complications such as gastrointestinal and intracranial bleeding (Table 1). Mainly new patients with thromboembolism were selected. 18,618 were treated with apixaban and exactly the same number of patients were treated with rivaroxaban. The results are as follows:

	Recurrent thromboembolism in 2 months	Recurrent thromboembolism in 6 months	Gastrointestinal and intracranial bleeding in 2 months	Gastrointestinal and intracranial bleeding in 6 months
Apixaban	0.005	0.011	0.010	0.013
Rivaroxaban	0.011	0.013	0.011	0.015

Table 1: The results concerned the treatment of deep vein thrombosis as well as the accompanying pulmonary embolism.

According to a study by the University of Pennsylvania (Table 2) in exactly the same time period we have the following results:

	Recurrent thromboembolism -Pulmonary embolism	Gastrointestinal bleeding	Intracranial bleeding
Apixaban	0.6	7	0.2
Rivaroxaban	1.8	10.6	0.4

Table 2: The same time period in a study by the University of Pennsylvania.

In a global base collection study we have the following results from Maastricht University Medical Center (Table 3), Netherlands published in 2014.

	Recurrent thromboembolism combination with death	Severe bleeding	Minor bleeding	Mortality
Apixaban	0.59	0.16	0.38	0.52
Rivaroxaban	1.18	0.53	0.60	1.19

Table 3: A global base collection study from Maastricht University Medical Center.

The Ampilfy study [4] found that apixaban is non-inferior to standard therapy (i.e. subcutaneous enoxaparin followed by warfarin) for the prevention of relapse venous thromboembolism and its use is associated with a lower risk of bleeding (relative risk 0.17-0.5). Similarly, results from the Einstein study [5] which evaluated rivaroxaban as a treatment of acute deep vein thrombosis as well as secondary prevention of venous thromboembolism found that rivaroxaban was non-inferior to standard therapy.

In the Caravaggio study [6], apixaban was found to be non-inferior to subcutaneous low-molecular-weight heparin for the treatment of recurrent venous thromboembolism in cancer patients. The effectiveness of apixaban contributes to more effective treatment and lower bleeding rates compared to other DOACS and especially to rivaroxaban.

In a personal smaller study at the General Hospital of Rhodes (Table 4) in a total sample of 100 patients of which 50 received apixaban and the rest rivaroxaban proved better results of apixaban in cases of pulmonary embolism, gastrointestinal and intracranial bleeding. The results are as follows.

	Thromboembolism-Pulmonary embolism	Gastrointestinal bleeding	Intracranial bleeding
Apixaban	1%	2%	0%
Rivaroxaban	5%	12%	2%

Table 4: The results of apixaban in cases of pulmonary embolism, gastrointestinal and intracranial bleeding.

Results

The results of my study shows that apixaban has 1% for thromboembolism-pulmonary embolism again rivaroxaban which is 5%. Also the rate of gastrointestinal bleeding for apixaban is 2% again 12% for rivaroxaban. For the complication of intracranial bleeding is 0% for apixaban and 2% for rivaroxaban.

Conclusion

In conclusion, we can say that the use of apixaban is safer and superior to rivaroxaban in the treatment of deep vein thrombosis, recurrent thromboembolism, pulmonary embolism, gastrointestinal and intracranial bleeding according to the data so far.

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