

# Saphenion® : COVID-19, varicose veins and venous thrombosis

Ulf Th Zierau\*

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The risk factors for superficial vein thrombosis (OVT) are almost identical to those for Venous Thromboembolism (VTE) in the deep leg and pelvic veins. However, the risk of superficial skin vein thrombosis is considerably higher if

there are already varicose veins. As can already be read everywhere, COVID-19 causes inflammation of the vascular wall of the deep leg veins. Considered on its own, this has a thrombogenic effect.

**Key Words:** Varicose Veins; COVID-19 and vein wall inflammation; COVID-19 and venous thromboembolism

## INTRODUCTION

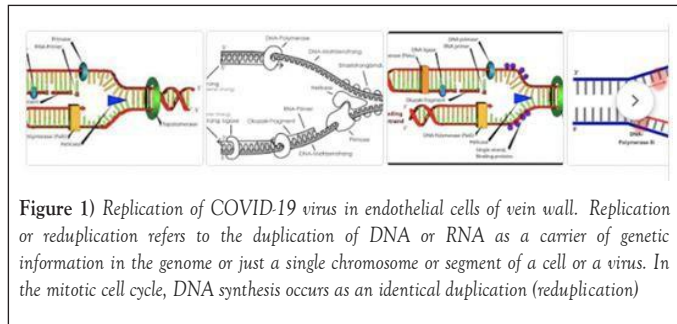
The risk factors for superficial vein thrombosis (OVT) are almost identical to those for Venous Thromboembolism (VTE) in the deep leg and pelvic veins. However, the risk of superficial skin vein thrombosis is considerably higher if there are already varicose veins [1-3].

This is due to the defective venous valves, through which the venous blood of the leg veins gets into the lower leg veins in a pathological alternating flow and return current! This reflux increases the pressure in the deep veins to over 120 mmHg and with that alone there is a high risk of thrombosis.

Now a virus is added, which obviously accumulates and multiplies in all the inner walls of the leg veins. This also applies to the vascular wall of varicose veins!

As can already be read everywhere, COVID-19 causes inflammation of the vascular wall of the deep leg veins. Considered on its own, this has a thrombogenic effect [4-7].

But this fact is not new: As COVID-19, also the flu virus, by the way-causes inflammation of the vascular wall of the deep leg veins. Considered on its own, this has a thrombogenic effect. These facts are known since 1970 (Figure 1) [8-10].



**Figure 1)** Replication of COVID-19 virus in endothelial cells of vein wall. Replication or reduplication refers to the duplication of DNA or RNA as a carrier of genetic information in the genome or just a single chromosome or segment of a cell or a virus. In the mitotic cell cycle, DNA synthesis occurs as an identical duplication (reduplication)

## Saphenion®: COVID-19, varicose veins and venous thrombosis: Common cause virus infections

Varicose veins are the main cause of superficial vein thrombosis (OVT) of the lower extremities, but underlying diseases that already exist in parallel (e.g. autoimmune diseases, infections, malignancy or coagulation disorders) must also be looked for in superficial cutaneous vein thrombosis. A simultaneous in deep vein thrombosis after cutaneous vein thrombosis of varicose veins occurs in 15% of all those affected. The severe complication pulmonary embolism can be seen in around 5% of those affected.

However, these numbers do not yet take into account the pathological influence of various viruses (such as flu viruses and COVID-19) [4-7,11-21] (Table 1).

**TABLE 1**  
**Results from Basler study-frequency of leg venous diseases in 4529 apparently healthy people**

Male	Female	Complications
44%	76%	leg discomfort
6%	14%	phlebitis
2%	3%	pulmonary embolism
56%	55%	varicose vein
20%	11%	stem varicose veins
(Spider veins or reticular varices 3 times, 4 times more often than the trunk varicose)		
Chronic venous insufficiency in 15% (same), From that 6% of them with skin changes and 1% with leg ulcers.		
Age dependency:		
oldest	5 times more often	complaints
		phlebitis
		pulmonary embolism
	10 times more often	varicose vein
		chronic venous insufficiency

Many viral infections (flu, HIV, varicella, COVID-19) are associated with coagulation disorders. All aspects of the coagulation cascade, hemostasis, coagulation, and thrombosis dissolution can be affected. As a result, thrombosis and bleeding can occur in all vascular regions. The investigation of coagulation disorders as a result of various viral infections was not carried out uniformly. Common paths are therefore not fully understood. For many severe viral infections, there is no other treatment than supportive measures. We have already suggested some ways of doing this

The question that must be asked here is whether the venous wall inflammation of the varicose vein does not exist first and whether the thrombosis of the varicose vein, which therefore quickly develops, migrates into the deep veins of the leg, which have already been damaged by the virus. This then leads to the often fatal pulmonary embolism, which is currently the case with COVID-19.

This pathological process in connection with viral infections was already discussed 50 years ago in connection with various flu pandemics and can be found in our literature research in many older scientific articles (Figures 2 and 3).

Saphenion Vein Care Center, Berlin, Germany

**Correspondence:** Ulf Th Zierau, Saphenion Vein Care Centers Berlin/Rostock, 10117 Berlin, Friedrichstrasse 95, Germany, E-mail: dr.zierau@yahoo.de

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Figure 2) Scientific paper from 1970: Influenza virus and thromboembolism

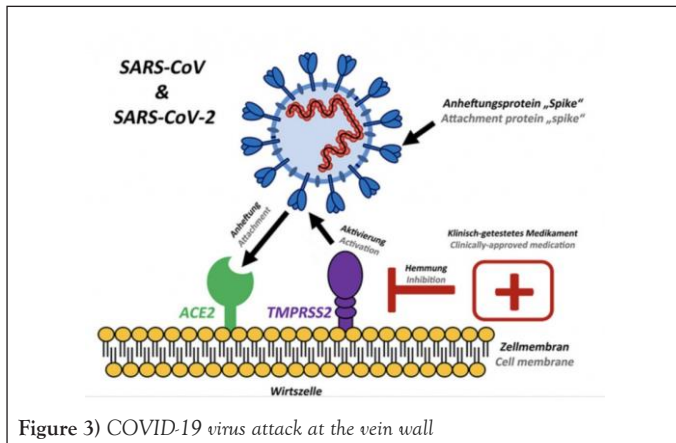


Figure 3) COVID-19 virus attack at the vein wall

CASE PRESENTATION

Saphenion: COVID-19, varicose veins and venous thrombosis: Current patient cases

In our practices in Berlin/Rostock, several (5) patients between the ages of 43 and 67 with pronounced varicose veins have presented since mid-May 2020. In the medical history, pneumonia as a result of pulmonary embolism as a result of COVID-19 infection was found in all cases [13,17,18,22-25].

In the patient interview, our patients reported superficial venous thrombosis in the area of the varicose veins. In one case, a patient had undergone radical surgical varicose vein operation 7 years before the COVID-19 infection and suffered from recurrent varicose veins and phlebitis on the operated left leg. She then had to be treated with a deep vein thrombosis. The pneumonia set in about 14 days after the cutaneous vein thrombosis (phlebitis); she initially did not notice the pulmonary embolism. When she was admitted to a Berlin hospital, the COVID-19 infection was found.

The infection has now healed and the deep veins have been recanalized-we recommended that our patient rehabilitate the cutaneous vein system using VenaSeal®-vein glue and micro-foam therapy. This was then carried out on all five patients, in three cases both legs at the same time in August 2020- March 2021 using VenaSeal®-vein glue.

RECOMMENDATIONS

Saphenion®: COVID-19, varicose veins and venous thrombosis: Recommendations from a vascular surgical point of view

It is very important for us-as vascular surgeons-to point out that COVID-19 is not the first virus with these significant-sometimes fatal-side effects of thrombosis and pulmonary embolism. There are other risk factors too.

And in any case, this also includes varicose veins, which are generally not considered so much from the point of view of illness. In terms of viral complications, these represent an easy target and are the cause of very rapid thrombosis and embolism [1,2,9,13,16,20,22-24].

As a result, we urgently recommend our patients not only to address this problem in times of viral pandemics. Function and cosmetics are important factors, but complications as a result of varicose veins cannot be safely and precisely planned or predicted! This results in the recommendation for specialist diagnosis and

necessary therapy with the various therapy methods recommended today [9].

Saphenion: COVID-19, varicose veins and venous thrombosis: Recommendations of the professional associations

In addition to all these aspects, doctors need to keep an eye on something else. In the case of COVID-19, various mechanisms can lead to blood coagulation being disturbed. This can manifest itself in a pulmonary embolism, for example. In this complication, a blood clot obstructs one or more arteries in the lung.

Many of these thrombi, autopsy results suggest, have their origin in the deep leg veins. From there they are carried away with the bloodstream and flushed into the lungs and then, depending on the size of the clot, lay a pulmonary artery. As a result, the affected lung section is unable to breathe [23,24,26].

Depending on how big the blood vessel is that it is blocking in the lungs, an embolism can be fatal within a short time-this seems to be more common with COVID-19 than initially assumed. The risk of thrombosis and embolism in intensive care patients in hospital is 17%-47%.

The pulmonary embolism can also cause long-term damage. If it doesn't resolve completely, it can lead to pulmonary hypertension. In this case, one must speak of long-term damage. The clot increases the resistance in the pulmonary circulation against which the heart has to pump. In the long run, the right ventricle of the heart is also increasingly overwhelmed, the patients are exhausted with the slightest exertion, gasping for air, complaining of water in their legs and dizziness. Life expectancy is also limited in many cases by pulmonary hypertension. All the involved German specialist societies involved (DGA, DGP, DGG) have now published therapy and prophylaxis recommendations. In view of the current data situation and the experience since 3/2020, active drug-based thrombosis prophylaxis and therapy is recommended for inpatients treated as well as for all those discharging from hospitals [27-30].

CONCLUSION

Saphenion: COVID-19, varicose veins and venous thrombosis: Complete lockdown

In addition, drug thromboembolism prophylaxis for people not suffering from COVID-19 with other risk factors (coagulation disorders, varicose veins, previous thrombosis or phlebitis, other infectious diseases) is also recommended for the duration of a complete lockdown. The stay-at-home policy requires people to stay at home for longer periods of time. This means that inactivity and immobility are pre-programmed and an increased risk of thrombosis/embolism is provoked. It is therefore important first of all to have a specialist examination and clarification of these risks and, if necessary, appropriate drug and physiotherapeutic thrombosis prophylaxis [31-33].

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