

SUPERFICIAL VENOUS THROMBOSIS



“Orestes”, oil on canvas, 1846, Alexandre Cabanel.

“There is no pain so great as the memory of joy in present grief”

Aeschylus, Fifth century B.C

In his 2007, magisterial work, "The Great Books", Professor Anthony O'Hear, describes what he considers are the 17 greatest works of Western literature. All these works can be said to have had a profound influence on the thinking and philosophy of the West - works that have shaped who we are today. Among these works he includes the "Oresteia" of Aeschylus, (525 BC - 456 B.C). Aeschylus was a fascinating figure, being both a playwright and a soldier, (he was present at the battle of Marathon). The Oresteia is a trilogy of three plays, ("Agamemnon", "The Choephoroi", and "The Eumenides"), originally performed in Athens in 458 B.C. It is not an overstatement to say that these works, in the typical genre of Greek Tragedy, describe the birth of Democracy and the rule of Law, one of the greatest legacies bequeathed to Western civilization, from ancient Greece.

The trilogy commences with "Agamemnon", which opens by describing, in legend, what amounts to the ancient philosophy of "an eye for an eye - a tooth for a tooth". In the days when the gods of Olympus intermingled freely with humans, it fell to a certain Tantalus, the king of Lydia, to hold a great banquet for the gods. For reasons somewhat obscure, perhaps because he found he had no suitable meat on hand, he had his son Pelops killed and served up at the banquet as the meat dish! During the meal, the gods became aware of what he had done, but not before the goddess Demeter had managed to gnaw through a shoulder. Outraged, by this unforgivable and revolting act they condemned Tantalus to the very depths of Hades where he was destined to spend all eternity standing chest deep in water, which receded every time he tried to drink it and with grapes just in front of him which did likewise every time he reached out for them in hunger, (all from which we get the word "tantalize" from) - thus he would spend eternity in a state of perpetual starvation. Meanwhile the gods restored Pelops to life (with an ivory prosthetic shoulder), hoping that that was the end of the horrific matter.

But it wasn't. Pelops proved to be completely ungrateful as well as being every bit as monstrous as his father had been. The last straw came for the gods when one day Pelops, in order to win the hand of the daughter of the king of Elis, challenged the king to a chariot race. The king accepted, but Pelops employed a certain charioteer by the name of Myrtilos, to race for him but also to sabotage the king's chariot. This he did so effectively that the king was killed when his chariot crashed. Myrtilos, then on asking for his reward, was promptly killed by Pelops. This was a very bad mistake - as Myrtilos happened to be the demigod son of the great god Hermes. Hermes decided to put a terrible curse on Pelops, but terrified Pelops sought the protection of Hephaestus, the god of fire. Hephaestus did protect him from Hermes and he went on to conquer a large part of Greece, (which became the "Peloponnese"). Outraged, Hermes then decided that if he could not get revenge on Pelops he would instead place a terrible curse on all of Pelops' descendants.

Thus began a horrific cycle of never ending bloodshed within the family of Pelops. He had two sons, Atreus and Thyestes. Thyestes seduces Atreus' wife. Then in return, in a sickening echo of his grandfather, Tantalus, Atreus puts on a banquet for Thyestes serving up Thyestes' two sons as the main course! Thyestes, horrified, flees from Atreus into exile with his third son Aegisthus. The sons of Atreus are none other than Agamemnon and Menelaus. The family curse continues in full force. Menelaus has his

beautiful wife Helen abducted by Paris of Troy. Agamemnon offers his help in leading a great army to Troy to bring back Helen but before embarking with his fleet has his own daughter Iphigenia killed as a sacrifice for a fair wind to Troy. Agamemnon's wife, Clytemnestra, is devastated and vows she will get her revenge for her husband's killing of their daughter. While Agamemnon is away at the Trojan War, Clytemnestra has an affair with Aegisthus - and bides her time planning her revenge. Finally after 10 long years Agamemnon returns home victorious. While he is having a bath, Clytemnestra seizes her chance and throws a great net over him and stabs him to death. The family curse then extends to the next generation. Agamemnon's son, Orestes (the great grandson of Pelops) spurred on by his sister, Electra, seeks revenge on his mother for killing his father. He proceeds to kill not only his mother, but her lover Aegisthus as well.

By this stage the family's deeds have caught the attention of the Furies - terrifying spirit like creatures, half female and half bird, whose task it is to seek out vengeance on those who commit particularly heinous crimes. And it is no wonder that the family of Pelops catches their attention; Atreus (incest, fratricide and cannibalism), Agamemnon, (murder, daughter killing and adultery), Menelaus (instigator of the Trojan War), Orestes (matricide). A terrified Orestes flees to the city of Athens pursued by the Furies. By this stage the goddess Athena is thoroughly disgusted with the seemingly endless cycle of primitive retribution and private revenge, and counter revenge, a vicious cycle, it should be pointed out, initiated by the gods themselves. She intervenes against the Furies and sets up a court of justice where she will hear all sides of the whole sorry story, from Orestes and the Furies. In the end she decides the only way to break the cycle of blood is to pardon all parties, but to lay down public laws agreed to by all. Orestes is freed from the Furies, and the Furies themselves are transformed into law-abiding beings known as the "Kindly Ones". Aeschylus' "The Oresteia" was first performed in Athens in 458 B.C, a time when Athenian power and civilization was in the ascendant. Although the Athenians themselves would not always abide by good public law, over the ensuing centuries the plays of Aeschylus lived on in their collective memories and the goddess Athena's philosophy of the rule of law would eventually emerge triumphant over the ancient Biblical philosophies of an eye for an eye, finally breaking Hermes' perpetual curse on humanity.

When we assess our patients for a superficial thrombosis, we must beware of a sinister underlying curse! This curse may be in the form of an underlying acquired pathology or indeed it may be a familial one. We must like Athena find a way, to break the vicious cycle or at least limit its inevitable future manifestations. For this reason we consider the possibility of an underlying curse in all cases!

SUPERFICIAL VENOUS THROMBOSIS

Introduction

The term phlebitis refers to the presence of inflammation within a vein, whereas thrombosis indicates the presence of clot.

The term thrombophlebitis is used broadly in the literature and often refers to venous inflammation even when it is unclear whether thrombosis of the vein has occurred. In the lower extremity, superficial phlebitis is commonly associated with venous thrombosis.

The following refers primarily to **superficial venous thrombosis**.

Superficial venous thrombosis is rarely a life threatening entity. It carries a low risk of pulmonary embolism, (approximately < 1% in untreated patients), however, the concurrent incidence of an underlying DVT is **not** low, (*even in another limb*) (approximately 25 %).

A thorough diagnostic evaluation is still mandatory because many patients with superficial venous thrombosis:

- **May extend to become deep, (hence increase the risk of pulmonary embolism).**
- **May have a significant underlying pathology, (the underlying risk factors for developing superficial thrombosis is similar to that of DVT).**

Every effort should therefore be made to prevent superficial thrombophlebitis from progressing to involve the deep veins, because damage to deep vein valves leads to chronic deep venous insufficiency (postphlebitic syndrome) as well as to PE.

The greatest risk of extension to the deep system seems to be in cases involving the **great saphenous vein in the lower limb**, above the level of the knee, especially when this is near the saphenous-femoral junction.

Anatomy

The venous drainage system of the upper limb is divided into the superficial system, which run with the lymphatics, and the deep system which runs with the deep arteries.

See Appendix 1 below.

Pathophysiology

Superficial thrombophlebitis is due to inflammation and/or thrombosis, and less commonly infection of the vein.

Superficial thrombophlebitis should be assumed to involve the deep veins until proven otherwise, because superficial vein thrombophlebitis and deep vein thrombosis **share the same pathogenesis, and risk factors.**

In addition to the well recognized risk factors for DVT, superficial thrombophlebitis may be precipitated by:

- Local trauma, including cannulations.
- Varicose veins.
- Stasis.
- IV drug abuse.
- IV therapeutic drugs leading to a phlebitis and/or thrombosis.

Complications:

1. Progression with **extension** into the deep venous system.
 - The risk appears to be low in cases of upper limb *superficial* venous thrombosis
 - It is relatively higher in superficial venous thrombosis that involves the great saphenous vein above the level of the knee.
2. There is a high **associated** incidence of deep venous thrombosis, (approximately 25 %):
 - This occurs because hypercoagulable states tend to produce thrombosis simultaneously at multiple sites in both the superficial and deep venous systems.

So although the risk from superficial thrombophlebitis itself is low, there is still risk in the sense of its association with deep thrombosis.
 - The site of the associated deep vein thrombosis is not necessarily contiguous with the site of the superficial thrombophlebitis.
3. Secondary infection, this is referred to as septic thrombophlebitis.

Clinical features

Normal veins may be distended visibly at the foot, ankle, and occasionally in the popliteal fossa, but not usually in the rest of the leg. Dilated superficial leg veins above the ankle therefore are usually evidence of venous pathology.

There may be associated signs of chronic venous stasis.

Clinical examination alone cannot reliably rule out associated deep vein thrombosis.

Thrombosed superficial veins may show:

- Tenderness along the line of the vessel.
- Swelling of the vessel.
- Induration/ thickened vessel.
- Erythema and fever if secondarily infected.

Superficial thrombophlebitis typically develops over a period of hours to days and takes days to weeks to resolve. An indurated cord may persist for weeks to months.

All patients should also have a thorough physical assessment to rule out possible underlying causes of thrombosis, particularly **malignancy**.

Differential diagnoses:

These can include:

1. Cellulitis.
2. Lymphangitis
3. DVT
4. Suppurative thrombophlebitis:

Low-grade fever may occur in uncomplicated superficial phlebitis, but high fever, fluctuance and/or purulent drainage suggest infection (i.e., septic thrombophlebitis).

Suppurative thrombophlebitis is suspected when erythema extends significantly beyond the margin of the vein and is likely to be associated with significant fever.

Septic thrombophlebitis is uncommon in the absence of a history of direct vascular injury such as venepuncture or catheterization.

Investigations

Blood tests:

The need for blood tests will be directed by the clinical suspicion for any underlying pathology.

The following may need to be considered:

1. FBE
 - For an infective element, or intrinsic haematological problem.
2. CRP
3. U&Es/ glucose
4. **A procoagulation screen.**
 - **See Lower limb DVT document.**
5. Biopsy:
 - This may be appropriate in selected cases where diagnosis is unclear or an inflammatory vasculitis (such as PAN) is suspected.

Ultrasound:

As clinical examination alone cannot reliably rule out associated deep vein thrombosis, imaging should therefore be ordered to:

- Confirm the diagnosis.
- **Rule out any associated deep venous thrombosis.**

Note that in a superficial clot of the lower limb – an ultrasound study of the opposite lower limb should also be undertaken.

Ultrasound is the best initial modality of imaging.

Note that the principal **deep vein of the thigh is often referred to incorrectly as the “superficial femoral vein.” It is vital not be misled by this nomenclature. Patients have died because clinicians mistakenly have treated thrombus in the “superficial” femoral vein as though it were a superficial phlebitis, when in fact it is the most serious type of DVT.**

MRI

Magnetic resonance venography (MRV) is more sensitive and more specific than ultrasound in the detection of deep venous thrombophlebitis and may be useful when ultrasound examination is equivocal.

It has the added advantage over ultrasound in being able to detect alternate pathology in the limb.

Management

The initial priorities in the ED will include the ruling out of:

- Any associated **deep** venous thrombosis.
- Any suspicion of associated PE
- Any suspicion of septic thrombophlebitis.

Once a diagnosis of superficial thrombophlebitis has been made, every effort should be made to prevent this from progressing to involve the deep veins, in order to reduce the risk of recurrent local complications or of extension into the deep venous system.

Exact treatment protocols are currently not well defined for superficial venous thrombosis.

The following provides a general a guide, however each case needs to be judged on its own merits, and Haematology consultation is recommended in cases which are unclear.

Anticoagulation versus antiplatelet therapy:

Cases requiring anticoagulation:

In general terms a superficial venous thrombosis that requires **therapeutic** anticoagulation will include:

- Those within 1 cm of the deep venous system.
 - ♥ i.e. Within 1 cm of the **sapheno-popliteal junction** or within 1 cm of the **sapheno-femoral junction** or the cephalic vein with extension into the axillary vein.
- Those with significant associated thrombosis risk factors, (e.g. Active malignancy, previous history of thrombosis, known procoagulation disorders, recurrent episodes).

For those cases which are beyond 1 cm of the deep venous system, and without associated risk factors, **prophylactic** anticoagulation may *still* be required if the thrombosis is:

- Extensive (> 5 cm)
- Is causing significant symptoms.

In these cases prophylactic (as opposed to therapeutic) anticoagulation for a period of **2-6 weeks** of treatment, (discuss the exact duration with the Hematology Unit).

Note that currently NOAC agents are **not** indicated for the treatment of *superficial* thrombosis.

Indefinite anticoagulation is not generally indicated for cases of uncomplicated superficial thrombosis.

Cases not requiring full anticoagulation:

Other cases outside of the above groups do not require full anticoagulation treatment.

It is reasonable to treat these with **antiplatelet agents** or **NSAIDs** and to **closely observe** for any extension.

Repeat ultrasound examination should occur within **7-10 days**.

Antibiotics:

If **suppurative** thrombophlebitis is suspected, antibiotic treatment, surgical drainage and potentially vein excision are indicated.

Surgery:

In the past, surgical interruption of the saphenofemoral junction (with or without removal of the saphenous vein) was recommended for patients with greater saphenous thrombosis approaching the saphenofemoral junction. Enthusiasm for this approach however has decreased significantly.

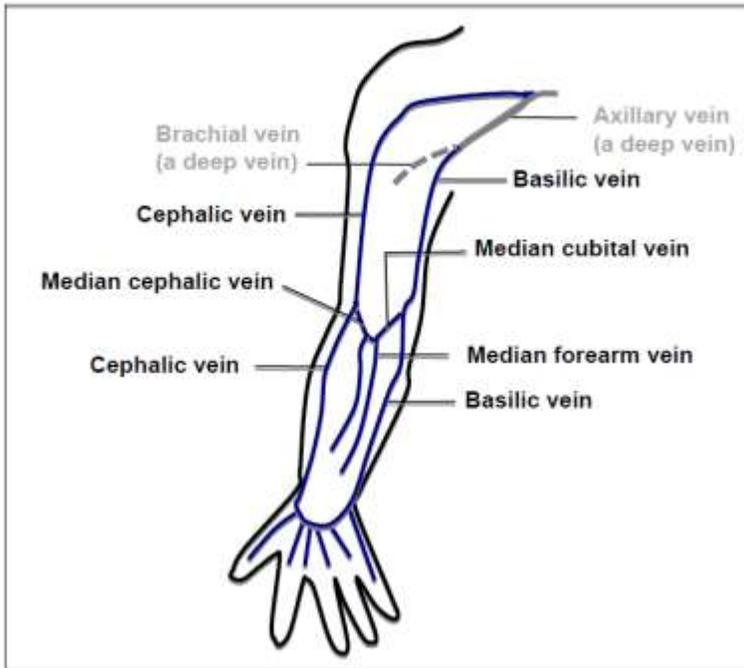
It may remain an option in those patients who have an absolute contraindication to anticoagulation.

Disposition:

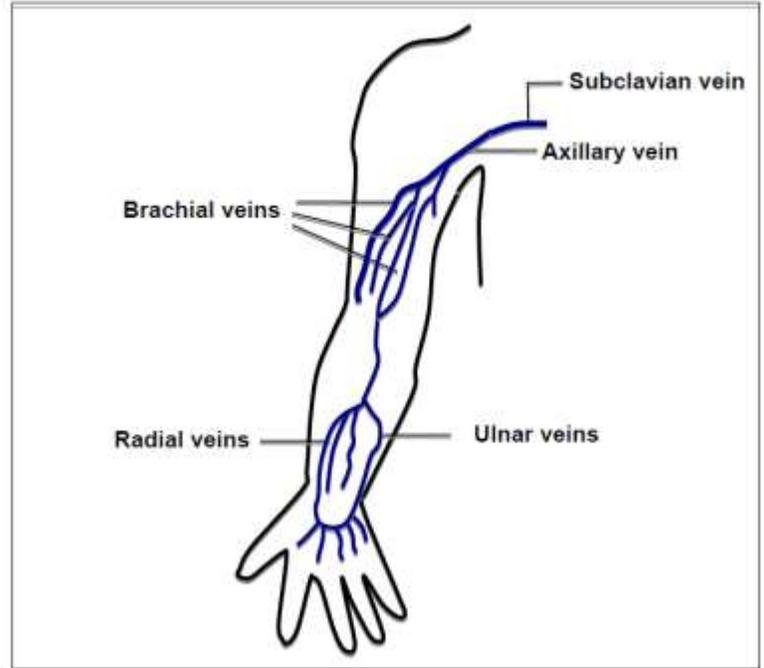
In cases where the need for full anticoagulation is uncertain there should be early **Haematology** consultation.

Appendix 1

Superficial Veins

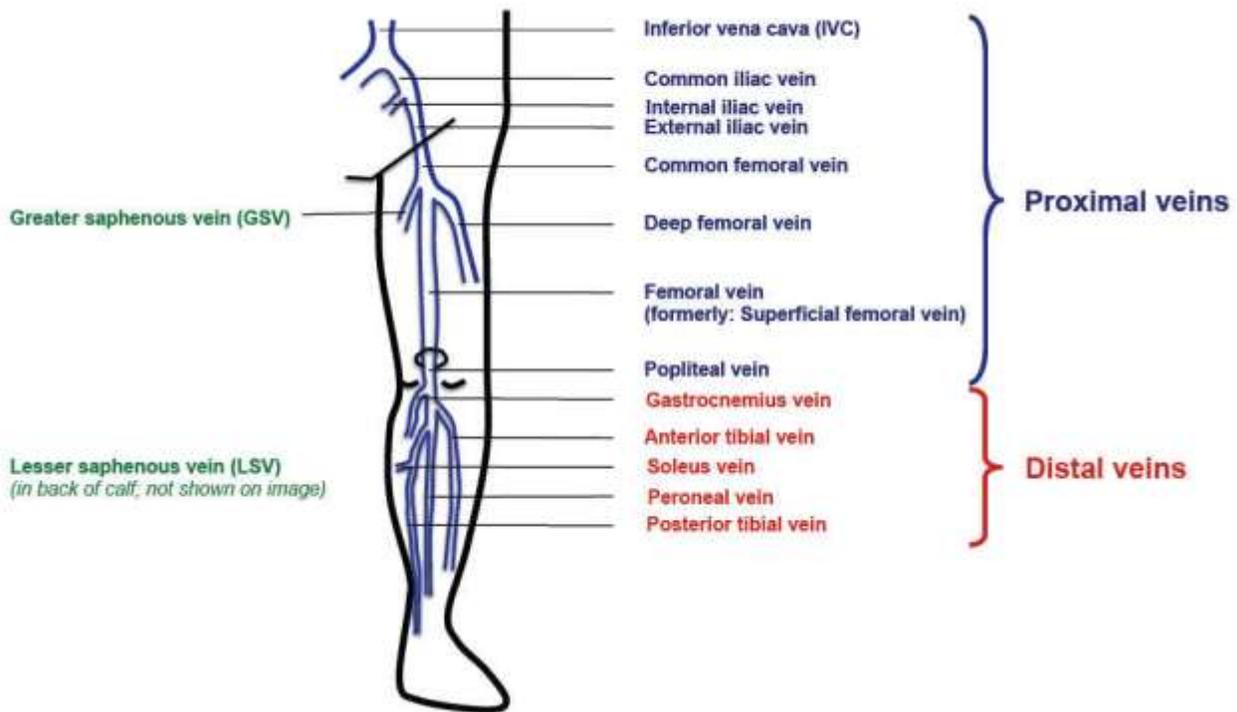


Deep Veins



Superficial veins

Deep Veins



The superficial and deep veins of the Upper and Lower limb.



“Orestes Pursued by the Furies”, (detail), oil on canvas, 1862, William Adolphe Bouguereau.

References

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