SUPERFICIAL VEIN THROMBOSIS (SVT)

TERM DEFINITION

Thrombosis and inflammation of superficial vein leading to painful, warm, erythematous, tender cord-like structure, usually involving the lower limb.

CLASSIFICATION*

VARICOSE VEINS

NO

Non-varicose vein-SVT (NV-SVT)
Many causes or risk factors, similar to deep vein thrombosis.

** An alternative classification is **primary** (inflammation affects vein and surrounding tissue) and **secondary** (inflammation in vein and systemically).*

YES

Varicose vein-SVT (V-SVT)
10x more frequent that NV-SVT.

CLINICAL PEARLS

SVT → DVT

SVT is a risk factor for deep venous thrombosis (DVT) & pulmonary embolism (PE).

SVT + DVT

36% of patients with SVT have concomitant DVT.

SVT > DVT

Incidence of SVT is greater than that of DVT.

CLOTS

60-80% of cases involve greater saphenous vein, 10-20% the small saphenous vein.

CATHETER-ASSOCIATED SVT

SVT may affect upper extremities, typically in hospitalized patients with venous catheter.

VIRCHOW'S TRIAD

Risk factors include those that slow blood flow, damage the vessel wall and increase coagulation.

PRESENTATION

SYMPTOMS

SVT:
- Redness, pain and warmth along vein

CONCOMITANT DVT:
- Leg swelling
- Leg pain

CONCOMITANT PE:
- Chest pain
- Shortness of breath
- Hemoptysis

SIGNS

- Palpable, tender, red vein ("cord")
- Localized edema in surrounding soft tissue
- Pre-existing varicose veins

RARE TYPES OF SVT

Trousseau syndrome: recurrent, migratory SVT secondary to malignancy, particularly adenocarcinoma of pancreas.

Mondor's disease: SVT affecting superficial veins of breasts, groin or penis.

Thrombophlebitis migrans: inflammation of vein wall that moves proximally or distally.

Thrombophlebitis saltans: inflammation of vein wall that jumps from one vein to another.

DIAGNOSIS

Duplex ultrasound, usually of both legs to rule out concomitant deep vein thrombosis (DVT).

Findings include:
- Decreased blood flow through vein segment.
- Lack of vein compressibility.

DIFFERENTIAL DIAGNOSIS

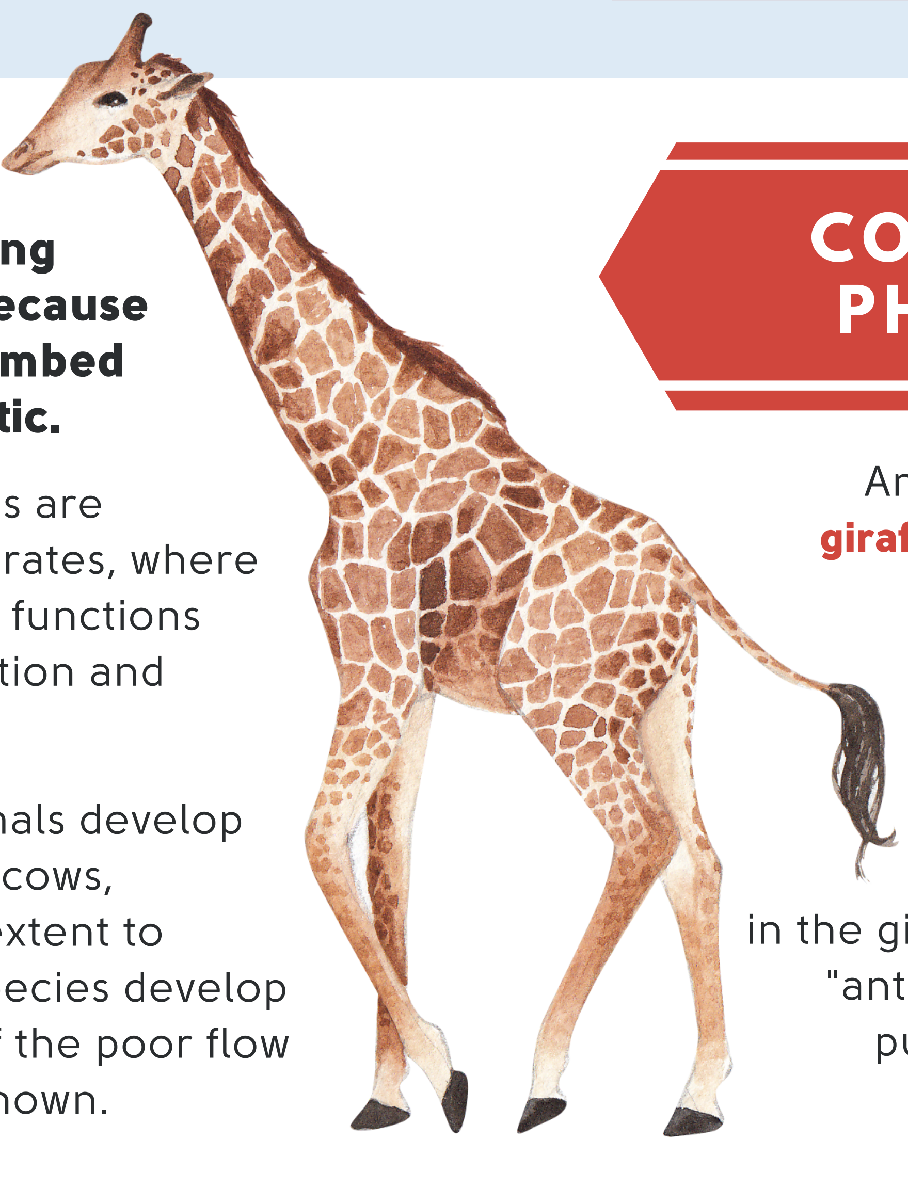
- DVT
- Lymphangitis
- Cellulitis

THERAPEUTIC PRINCIPLES

Goals of treatment:
- To reduce symptoms.
- To prevent extension to deep veins and pulmonary veins.

Anticoagulation:
- If ≥ 5 cm in lengthand/or located > 3 cm from sapheno-femoral junction
- Typically fondaparinux or DOACs for total 6 weeks.

Nonsteroidal anti-inflammatory drugs:
- To relieve inflammation and pain.



COMPARATIVE PHYSIOLOGY

Humans are uniquely vulnerable to developing venous insufficiency because we are bipedal, long-limbed and our leg skin is elastic.

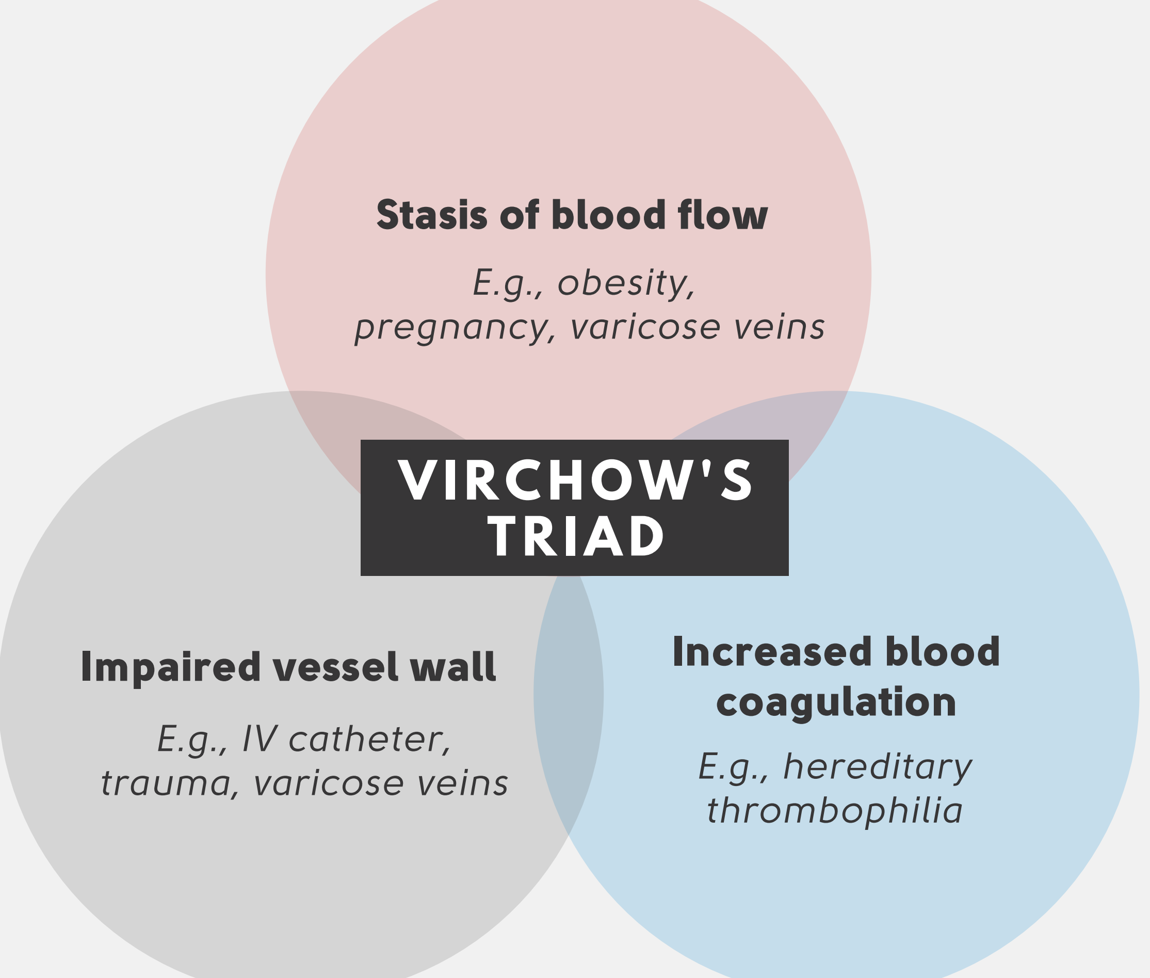
However, superficial veins are ubiquitous among vertebrates, where they perform a variety of functions including thermal regulation and oxygen exchange.

Some domesticated animals develop varicose veins, including cows, horses and buffalo. The extent to which these and other species develop SVT (as a complication of the poor flow through varices) is not known.

An interesting question is why **giraffes** do not develop varicose veins. They have blood pressures of over 400 mmHg in their lower extremities! It turns out the dependent edema in the giraffe is prevented by a tight "antigravity suit", and by muscle pumping of blood and lymph towards the heart.

PROXIMATE MECHANISMS

Superficial veins drain the skin and surrounding tissue. They also provide a cooling function. When we overheat, our superficial veins dilate, allowing heat to dissipate from the body. Like deep veins, superficial veins are endowed with one-way valves which ensure unidirectional blood flow towards the heart. These valves are specializations to counteract the raised hydrostatic pressure in the vessels of the extremities. Thrombosis of the superficial vein occurs when one or more of Virchow's triad is disrupted.



VIRCHOW'S TRIAD

Stasis of blood flow
E.g., obesity, pregnancy, varicose veins

Impaired vessel wall
E.g., IV catheter, trauma, varicose veins

Increased blood coagulation
E.g., hereditary thrombophilia

HISTORY OF MEDICINE

The early history of superficial vein thrombosis (SVT) is largely limited to surgical texts. For example, William Osler's The Principles and Practice of Medicine (1909 edition) includes no mention of SVT, whereas a book by Alexander Johnson entitled Surgical Diagnosis, published in the same year, has a wonderfully detailed description of SVT. Early treatment included bed rest, leg elevation, hot and cold compresses, antibiotics, analgesics and vein stripping.

NOTES

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ENCYCLOPEDIA OF BLOOD