Managing Sclerotherapy Complications

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Objectives

- The learner will be able to describe the most common complications of visually-guided sclerotherapy of the lower extremities
- The learner will be able to identify prevention techniques or techniques that may minimize complications.
- The learner will be able to list treatment strategies of the most common complications of visually-guided sclerotherapy of the lower extremities

Complications......

“We look for medicine to be an orderly field of knowledge and procedure. But it is not. It is an imperfect science, an enterprise of constantly changing knowledge, uncertain information, fallible individuals, and at the same time lives on the line. There is science in what we do, yes, but also habit, intuition, and sometimes plain old guessing. The gap between what we know and what we aim for persists. And this gap complicates everything we do.”

- Atul Gawande, Complications: A Surgeon’s Notes on an Imperfect Science
Know who you are treating!

- Physical assessment
- Through and current history
- Duplex ultrasound (if needed)
- Know risk factors that would increase likelihood of complication
- Before photos
- Consent form
- Manage patient expectations

Urticaria

Histamine releases from mast cells in the skin causing localized edema, often in the form of wheal

- Red, raised and itchy areas at the site of injection
- Physically induced by sclerosant, not an allergic reaction
- Self limiting, no treatment necessary
  - May use a topical corticosteroid
- Verbally reassure patient that the itching and redness will be resolved in 4-24 hours

Intravascular Hematoma

(intravascular coagulum, trapped blood, dead blood)

A liquefied thrombus trapped between the two ends of a treated vein

- Diagnostic evaluation
  - Visual inspection and palpation
  - Ultrasound
- Interventions
  - Puncture/Aspiration of post-sclerotherapy hematoma

*Coagulum, if left in place, turns into hemosiderin.*
Intravascular Hematoma
(intravascular coagulum, trapped blood, dead blood)

**Considerations**

- Intervene within 2-4 weeks
- Choose most efficient/effective sclerosant concentration for location and size of vein
- Injection of small volumes from single points of entry
- Encourage compliance with graduated compression stockings and ambulation

*Coagulum, if left in place, turns into hemosiderin.*

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Hyperpigmentation

Hemosiderin staining happens when blood leaves a ruptured blood vessel, the red blood cell dies and the hemoglobin from the red blood cell is released into the dermis.

- Incidence: 10-30%
  - Occurs within 4-6 Weeks
  - 60% resolve within 6 months
  - 90% resolve within 1 year
  - 1-10% have pigment > 1 year

- Possible risk factors
  - Taking Minocycline
  - History of high iron stores
  - Intense, persistent sun exposure during treatment process
  - Possible link to those patients with dark hair and darker pigmented skin tones (controversial)

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An Ounce of Prevention....

- Minimize Risk of Vessel Rupture and RBC Extravasation by Reduced Syringe Pressure
  - Smaller syringes = greater pressure
- Appropriate Solution Type and Concentration For Vessel Size
- Eliminate Feeder Sources First
- Post Treatment Compression
- Prompt Removal of Trapped Blood
- Avoid Treatment in High Risk Patients
Hyperpigmentation

**Interventions**

*Time is the first line intervention!*

- Topical agents
  - Bleaching creams
  - Exfoliants
- IPL laser
- Iron Chelation

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**Considerations**

- Pigmentation post VGS happens despite good technique
- Assess for possible risk factors before treating the patient
- Review with patient the possibility of hyperpigmentation prior to the start of therapy
- Go low and go slow
- Prevention is better than intervention
- Take photographs and document

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**Telangiectatic Matting**

*Presents as “blush type” area containing large numbers of tiny red blood vessels that are less than 0.2 mm in diameter, directly associated with previously sclerosed or surgically removed veins.*

- The etiology is unknown
  - Angiogenesis
  - Inflammation secondary to endothelial injury
  - Exposure to estrogen containing hormones

*15-24% incidence*

- Common areas that TM will occur are medial and lateral thighs, medial and lateral calves, medial ankles
- Develops rapidly, can resolve spontaneously
Telangiectatic Matting

**Treatment options**

- Reevaluate possible sources of reflux not recognized on initial exam.
- Time — TM may resolve on own with or without further intervention, use verbal reassurance liberally.
- Inject remaining TM with Glycerin or low concentration of detergent sclerosant if not resolved after all sources of reflux are treated and the area was given time to resolve on own.
- Consider discontinuing contraceptive therapy for 1 month prior to beginning sclerotherapy and delaying reinstitution of such therapy for at least 2 months following the last treatment session.
- Encourage weight loss in obese individuals prior to institution of therapy.
- IPL laser

Telangiectatic Matting

**Considerations**

- Educate patient of the possibility of complication prior to start of treatment.
- Assess for risk factors prior to treatment.
- Use the lowest concentration and lowest volume of the chosen sclerosant that will effectively obliterate the vein.
- Use low pressure when injecting the sclerosant to minimize excessive vessel injury.
- Do not use stronger sclerosant or multiple treatments in effort to resolve TM.
- Document progress or resolution by photographing patient every 6 to 8 weeks.
- Consider stopping Estrogen therapy only after careful consideration and consultation with both supervising physician and patients prescribing physician.

Cutaneous Necrosis

**Localized superficial tissue damage as a direct result of sclerotherapy.**

Ischemic necrosis that is caused by the arterial component of the vascular bed becoming occluded.

- Bright erythema may be seen immediately after injection.
- Prolonged blanching, can also be described as porcelain-white appearance immediately after injection.
- Pain can be immediate or delayed.
- Dermis can turn pale or dusky.
- Dermal sloughing starts 24-72 hours after the ischemic event.
- Ulcer can occur at site.
Cutaneous Necrosis

Interventions

• Vigorous massage of extravasated area may decrease tissue damage
• If arteriolar injection or spasm suspected vigorously massage using 2% nitroglycerine ointment
• Hyaluronidase
  – Enzyme that rapidly diffuses extravasated solution thus minimizing tissue damage
  – Dose 75 units re-constituted in 0.9% sodium chloride
  – Must be injected into affected area with in 60 minutes to be effective
• Occlusive dressings are used to speed healing process and decrease pain
• Debridement of wound using either hydrocolloid dressings or surgical excision of necrotic tissue will promote granulation tissue formation.
• Short stretch wraps can be used if edema present

Careful and methodical technique must be used

• Stop injecting if you feel resistance
• Stop injecting if a bleb or wheal forms
• Stop injecting if prolonged blanching occurs
• Use the lowest volume and weakest concentration of sclerosing agent needed to close down target vein
• Inject using slow steady pressure
  • Smaller syringes = greater pressure
• Ultrasound guidance should be used for foam sclerotherapy of deeper reticular veins
Cutaneous Necrosis

High incidence of litigation with this complication

- Areas of skin necrosis after Sclerotherapy take 4-12 weeks to heal
- Explain length of healing process, frequent follow-up in the beginning
- Reassure patient that the wound will heal, usually with a cosmetically acceptable scar

- Photo document ulcer at discovery and continue to photo document progress of healing at follow up appointments
- Document location and size of necrosis, and note the amount and concentration of sclerosant used in last treatment session prior to discovery.
- Monitor patient for signs and symptoms of infection

Superficial Venous Thrombosis

A tender, red, hard cord along length of superficial vein

**Biology**
- Hypercoaguable state
- Change in vessel wall
- Change in blood flow

**Signs and symptoms**
- Erythema, induration, tenderness
- Can have associated warmth and edema
- Must rule out cellulitis or lymphangitis if no SVT seen on ultrasound

**Diagnostic evaluation**
- Visual inspection
- Duplex ultrasound

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**Superficial Venous Thrombosis**

- Rule out DVT in a patient with superficial phlebitis
  - Patients with SVT have a 5%-40% chance of developing DVT
  - One study showed SVT patients have concurrent DVT in 28% of cases

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Superficial Venous Thrombosis

Interventions

- Can be benign and self-limiting
- Warm compresses
- NSAID’s
- Graduated compression stockings
- Low Molecular Weight Heparin
- Endovenous Laser Ablation
- High Saphenous ligation, and sometimes stripping

Deep Vein Thrombosis

A thrombus in the deep venous system

Pathophysiology

- Virchow’s triad
- Injection of large volume of sclerosing agent can travel into deep system
- Compression wrap administered too tight on thigh can occlude deep flow

Deep Vein Thrombosis

Signs and Symptoms

- Leg pain
- Erythema/warmth of affected limb
- Enlargement of calf or thigh
- Dilated superficial veins

50% of DVTs have no signs or symptoms
Deep Vein Thrombosis/PE

**Diagnosis**

- Duplex Ultrasound
- Venogram
- If Pulmonary embolism suspected
  - CT Angiogram
  - V/Q scan

**Interventions**

- Low Molecular Weight Heparin
- Warfarin, dabigatran, rivaroxaban
- Therapy to continue for 3 months (Grade 1B)
- Intravenous Heparin
- Graduated compression stockings (2 years)
- Ambulation
- Consider cessation of birth control pills or estrogen replacement therapy

**Considerations**

- Assess for risk factors prior to treatment
- Does patient have an acute DVT, history of DVT, known thrombophilia, active CA, Acute SVT?
- Discuss possibility of complication with patient prior to start of treatment
- Educate patient on signs and symptoms of DVT and PE
- Encourage ambulation and compliance with graduated compression stockings
- Limit volume of sclerosant even on surface sclerotherapy
- Be aware if combining surgical intervention and sclerotherapy in same treatment visit there is an increased risk of DVT and PE
- If placed on anticoagulant, monitor daily or weekly INR's for therapeutic level and document in chart (> 2.5, ACCP 2012 recommendation).
Nerve Injury

The **Saphenous nerve** is the largest and longest branch of the femoral nerve and supplies the skin over the medial side of the leg.

The **sural nerve** runs with the small saphenous vein on the posterior leg just lateral to the Achilles tendon. The sural nerve innervates lateral & posterior third of leg and lateral aspect of foot & heel, & lateral portion of the ankle.

Nerve Injury

Irritation or injury to the Saphenous or Sural nerves or cutaneous branches after sclerotherapy

- Diagnostic evaluation
  - History and physical
  - Pin prick test
    - "Numbness" versus Hypoesthesia
- Intervention
  - Usually self limiting
  - NSAIDs
- Considerations
  - **High incidence of litigation with this complication**
  - Assess for loss of sensory and/or motor function
  - Document location and size of surface area affected
  - Verbally reassure patient that nerves can regenerate over time

Neurological Complications

Variety of neurologic events occurring after injection of liquid sclerosant, foamed sclerosant, or use of "air block" technique

- Visual disturbances
  - Blurred vision
  - Pulsatile headache
  - Visual aura preceding migraine
- Migraine
- Monocular blindness
- Transient Ischemic attack (rare)
- Cerebral Vascular Accident (rare)
Neurological Complications

Patent Foramen Ovale
Air bubbles from foam sclerotherapy can travel from the right atrium to the left atrium and out to the brain. This can cause a variety of neurological symptoms from mild to severe.

Neurological Complications

Interventions
• May be self-limiting and no treatment necessary
• Neurological exam
• 100% oxygen
• Transfer to acute care facility
• Hyperbaric chamber indicated if symptomatic cerebral artery air embolus

Considerations
✓ Assess patient for history of cardiac abnormalities or migraines
✓ Limit the volume of foamed sclerosant on first visit
✓ Keep patient supine for 5 minutes after injection of foam sclerosant
✓ Document onset of neurological event and associated symptoms, progression or resolution of symptoms, vital signs, also note volume and concentration of sclerosant used

Allergic Reaction/ Anaphylaxis

Mild vs. Severe

Close observation

Be prepared!
Allergic Reaction/ Anaphylaxis

Mild Reaction
- Antihistamine PO
- H2 Blockers
- Steroids
- Monitor
- Consider IV access if progressing

Moderate/Severe Reaction
- O2 via NC or Mask
- Epi-pen or Epinephrine SQ/IV
- Antihistamine IM/IV
- Albuterol MDI for wheezing
- Steroids
- IV Access / IVF
- EMS
- Consider intubation for hypoxia, airway compromise

Emergency Drug box or Crash Cart

Allergic Reaction

Considerations
- An allergic or anaphylaxis reaction can happen on the first exposure or on any re-exposure to a sclerosant
- Assess for previous known allergy to sclerosant or history of multiple allergies
- Rapid recognition of an allergic reaction is essential
- Patients should be observed 30 minutes in office after injections
- Patients should be educated on signs and symptoms of allergic reactions in case of delayed onset
- An emergency plan and emergency kit including medications, supplies and oxygen should be available in all practice settings
- All staff should be properly trained to alert the emergency medical system
- Document vital signs, onset of symptoms, medications and response to medications given if an allergic reaction should occur
**Arterial Injection**

*An accidental injection of sclerosant into an artery causing damage ranging from mild to severe skin, subcutaneous tissue, and muscle necrosis.*

**Signs and Symptoms**

- Immediate burning pain at the site of injection, propagates along artery distribution
- Demarcated cyanotic pallor of affected area
- Compartment syndrome
- Necrosis of skin, subcutaneous tissue and/or muscle

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**High Risk Areas!**

![Diagram of high risk areas]

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**Arterial Injection**

*Absence of consistent guidelines!*

- Aspirate sclerosant if noted immediately
- Ice?
- Heparin
- Fibrinolytic therapy
- Vasodilators
- Catheter-directed thrombolysis
- Mechanical thrombectomy
Arterial Injection

This is a medical emergency!!

- Pain can happen quickly, or progress over several hours
- Polidocanol has a local anesthetic effect; pain may not be appreciated until several days later
- Document name of sclerosing agent, volume of sclerosant used, location of injection, vital signs, skin findings, and presence of pedal pulses
- Place ice at site of skin pallor to help decrease tissue damage
- Patient must be transported to hospital
- Vascular surgery and interventional radiology consult needed

The most feared complication....

The disappointed or unhappy patient!

- Acknowledge the complication
- OK to say that this is a known complication but you are sorry that this happened to them
- Get the physician involved (Allied Health professionals)
- Treat the complication
- Follow-up more frequently in the beginning (show you care)
- Take photo documentation
- Documentation in chart is important!
Take Aways.....

- Complications can happen even to the most experienced practitioner
- Know what they are and how to manage them
- Prevention is better than intervention!

Thank You!

References

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References

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