How to manage complications after sclerotherapy?

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I have the following potential conflicts of interest to report:

- Consulting
- Employment in industry
- Shareholder in a healthcare company
- Owner of a healthcare company
- Other(s)

- I do not have any potential conflict of interest
How to manage complications after sclerotherapy

• Complications can happen even to the most expert hands

• Mandatory to know what they are and how to manage them

• Early treatment can minimize sequels

• Most of them are minor

• But we must be alert and trained to react properly and immediately to serious adverse events
How to manage complications after sclerotherapy

• Serious complications: rare
  • Anaphylaxis
  • Cerebrovascular accidents
  • Venous thromboembolism
  • Tissue necrosis
  • Neurologic damage

• Minor complications: more frequent
  • Matting
  • Pigmentation

Systemic allergic reactions and anaphylaxis

- Extremely rare
- Emergency
- Unpredictable
- **Always be prepared** repeated exposures increases risk

Emergency and systemic adverse reaction protocol
TREATMENT OF SYSTEMIC ADVERSE REACTION AFTER SCLEROTHERAPY
HOSPITAL CRUZ ROJA MADRID

Early detection of symptoms
Injection stopped immediately

ANAPHYLAXIS  Symptoms in two or more

Cutaneous
urticaria, itching
erythema, flushing,
sneezing angioedema

Respiratory
coughing, hoarseness,
dyspnoea, wheeze, stridor

Cardiovascular
tachycardia

Alarm symptoms:
quick progression, respiratory distress, laryngeal oedema, (aphony, hypersalivation, stridor), persistent vomiting, hypotension, rhythm disturbances, syncope, confusion, sleepiness, coma

EPINEPHRINE im:
0,01 mg/kg (maximum 1 mg)

ADYUVANT THERAPY

Cutaneous symptoms:
Dexchlorpheniramine 5-10 mg /8h iv
Steroids iv:
Hydrocortisone 250 mg/6 h iv
Methylprednisolone 1 mg/kg/8h iv

Respiratory symptoms:
Salbutamol
4 ug/kg bolus iv
4 Inhalations/10 min nebulized 5 mg/3-4 h

Trendelenburg position
Keep the airway secure
Oxygen 100%
Access for IV fluids
Call emergency service

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Trendelenburg position
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ATROPINE iv:
0,01 mg/kg (maximum1 mg)

Keep the airway secure: guedel, endotracheal tube, tracheotomy
O2 100 % 6-8 l/min
0,9% sodium chloride solution or Ringer Lactate 25-30 ml/kg 10 minutes
Continuous monitoring (cardiac frequency, blood pressure, oxygen saturation
If suspect anaphylaxis: blood sample during and 2 hours after reaction for tryptase detection

UNDERLYING MEDICAL DISEASE

Specific treatment

CARDIO-RESPIRATORARY ARREST

Cardiorespiratory arrest protocol

VASOSPASM OR VENOUS GAS EMBOLYSM

Specific treatment
Large tissue necrosis: Intra-arterial injection

- Extremely rare: <70 cases
- High risk injections:
  - popliteal
  - inguinal
  - medial ankle
  - medial thigh
- **Amputation 52,5%**

No consensus or evidence-based guidelines on optimal management

**Intra-arterial injection treatment protocol**


*Immediate response to prevent amputation*
If severe pain with injection, stop the injection immediately, leave the needle unchanged, aspirate blood and remaining sclerosing solution if possible.
• Immediate IV heparin (5000-10,000 UI HNF) and continue heparin therapy at a therapeutic dosage for 6 days or longer.
• Consider immediate catheter-directed arterial thrombolisis.
• 500 mg Acetylsalicylic acid IV continue acetylsalicylic acid 100 mg or 325 mg daily 6 days or longer.
• Dextran 10%, 500 mL/day IV 3 days.
• Systemic steroids IV for at least 48 hours Continue oral Prednisona 0.75–1 mg/kg/day (max 50 mg day) with gradual reduction over 12 weeks.
• Analgesia with NAIDs, anxiolytic therapy and consider electrostimulation therapy
• Hyperbaric oxygen

Tissue and cutaneous necrosis

- Most frequent: ulceration
- All sclerosants
- Not always a physician mistake
- Rare and limited sequelae
- Several weeks after sclerotherapy
- Pain, inflammation, edema
- 4-6 weeks to heal
- small: 4 mm

Goldman MP 2017
Cutaneous necrosis: extravasation

Extravasation: immediate response

- Vigorous massage in extravasation area
- **Dilute the extravasated sclerosant as soon as possible:**
  - Hypertonic sclerosants: huge saline solution (10/1)
  - STS 3%: Hyaluronidase

Bergan JJ 2000
Cutaneous necrosis: Venoarterial reflex vasospasm

Treatment:

- **vasodilators** *(2% nitroglycerine ointment)* [immediate response]
- **Antiplatelets** oral
- **NSAIDS** oral
- Systemic **anticoagulant** and **steroids** if extensive necrosis anticipated

Cutaneous necrosis

- **Excision of the ulcer** speeds healing and decreases pain with acceptable scar

Goldman MP 2017
Transient neurologic events: visual disturbances and migraines

- **Nonspecific treatment:**
  - *Neurologic evaluation* and, **DVT**, **PE** and **RLS screening**
  - **Trendelenburg position** and **100% oxygen**
  - Headaches: **analgesia** and **triptans** in selected cases

Reina L 2017, International headache Society ICHD guidelines 2017
Ischemic neurological events: TIA and stroke

• TIA:
  – 5 published, all RLS, all after foam, and immediate onset

• STROKE:
  – 0.01%
  – 13 published cases:
    • RLS (FOP) etiologic factor most frequent
    • 4 after liquid, 9 after foam
    • 3 partial recovery, 9 total recovery
    • Immediate (paradoxical gas embolism)
    • With a delayed onset (paradoxical clot embolism)
    • 3/13 patients no gas, no clot discovered

Parsi K 2011
TIA o STROKE after foam with early onset

- 100% Oxygen immediately
- Place the patient in a head-down position for up to 10 minutes to clear bubbles from the cerebral circulation
- Confirm gas bubbles in arterial circulation by images tests as soon as possible
- Transfer the patient to a hyperbaric chamber
- Anticoagulation heparin IV with PTT >2
- Consider thrombolysis therapy with tissue plasminogen activator in selected cases
- If FOP, closure in a second step

Paradoxical gas embolism treatment

Immediate response

TIA or STROKE after foam with early onset

- Paradoxical gas embolism confirmed by imaging of bubbles in the intracranial arterial circulation as soon as possible
TIA or STROKE after foam with early onset

• Hyperbaric oxygen therapy:
  - Controversial results
  - No routine use

TIA or STROKE with delayed onset

Paradoxical clot embolism treatment

- STROKE guidelines recommendations
- Thrombolysis in selected cases

Parsi K 2011, Jauch EC 2013
Venous Thromboembolism

- <3%
- Most asymptomatic and located in lower leg

Venous Thromboembolism

- Treatment:
  No evidence based recommendations
  Depends on risk factors and extension of DVT

- Distal non occlusive DVT without risk factors has benign evolution with rapid recanalization:
  ambulation and compression, or NSAIDS or short LMWH or follow-up with ecodoppler

- Proximal DVT:
  oral anticoagulation 3-6 months
  look for risk factors for DVT

Superficial venous thrombosis

- Part of the process more than a complication
- Complication if there is an extension beyond the treated area or an excessive inflammation
- Incidence depends on individual understandings so highly variable (0-45.8%)

Superficial venous thrombosis

• DVT screening

Treatment:
• Minor (most frequent): no treatment or coagula extraction
• Symptomatic:
  • coagula extraction
  • ambulation
  • compression
  • NSAIDS
  • LMWH if extensive or affects SFJ

Nerve injury

- Very rare (0.02%)
- Sural and saphenous nerve
- Popliteal fossa and leg
- Transient paresthesia and dysesthesia (can last 6 months)

Treatment:
- **NSAIDS** in minor cases
- **Neurotropic agents** in long-term
- **Local infiltration with steroids and anesthetics**

Bergan J 2006, Goldman MP 2017
Matting

• Treatment technics:
  - no treated underlying reflux
  - high concentration, volume or pressure injection:
    • inflammatory reaction or excessive vein obstruction with angiogenesis

• Risk factors:
  - obesity, female, women, estrogens treatment, long duration of spider, family history of telangiectasia

Matting

- **Look for and eliminate underlying reflux** and residual veins with non-inflammatory sclerotherapy or phlebectomy

- **If no underlying reflux:** Wait
  - better than multiple treatments with stronger liquid sclerosants
  - mild anti-inflammatory cream **and follow up with photos** until resolution

Goldman MP 2017, Palm MD 2010, Goldman MP 1995
Residual pigmentation

- 3-4 weeks of sclerotherapy
- 10-30% short term
- 70% resolution at 6 months
- 10% >1-2 year
- Combination of hemosiderin (extravasated red cells) and melanin pigment (inflammatory process)

Gillet JL 2009, Goldman MP 2017, Palm MD 2010
Residual pigmentation

- Look for **underlying reflux** and eliminate it

Munavalli GS 2007, Palm MD 2010, Rabe E 2014
Residual pigmentation

- Extracting intravascular coagulum expedites resolution

Kern P 2007, Scultetus AH 2003
Residual pigmentation

**Compression:**

- anti-inflammatory effects, decrease chronic venous hypertension and helps coagula resolution

Rabe E 2014
Residual pigmentation

• **Time** is the first line of treatment
  • Most patients spontaneous resolution within the first year

Munavalli GS 2007, Palm MD 2010, Rabe E 2014
Residual pigmentation

Bleaching agents that affect melanocytic usually ineffective

Exfoliation with mild peeling agents

Chelation of the subcutaneous iron deposition

Q-switched laser therapy and intense pulse light can help

Transitory general effects

- Chest tightness, dry cough, nausea and a metallic taste

- Treatment similar to transitory neurologic disturbances:
  - Trendelenburg position
  - 100% O2 therapy
  - Evaluate neurologic and cardiovascular state

Frullini A 2011, Parsi K 2011
Conclusions

Serious adverse events are very rare:

• there are no evidence-based recommendations to manage them

• most treatment options are based on anecdotal experience or data extrapolated from others pathologies
Conclusions

- **EMERGENCY PLAN:**
  - Neurologic deficit
  - Intra-arterial injection
  - Systemic adverse reaction or anaphylaxis

- **TRANSPORT TO EMERGENCY SERVICES**

- **ACCESS TO HYPERBARIC THERAPY**

- **OXYGEN THERAPY**

Reina L. Phlebolymphology 2017
How to manage complications after sclerotherapy

• Minor complications require:
  • Time
  • Follow-up by the practitioner
  • Adherence with post-sclerotherapy treatment by the patient
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