Dermatologic Surgery Disasters: Presentation, Prevention, Management, and Legal Implications

Murad Alam MD, MSCI
David J. Goldberg, MD, JD
Categories of Cosmetic Complications

**INJECTABLES**

- **FILLERS**
  - a. Blindness
  - b. Skin necrosis
  - c. Nodularity

- **TOXINS**
  - a. Ptosis (brow, lid)
  - b. Lip asymmetry

**LASERS AND LEG VEINS**

- **ENERGY DEVICES**
  - a. Burns
  - b. Hyperpigmentation
  - c. Scar formation
  - d. Hypertrophic scar

- **LEG VEIN TREATMENT**
  - a. DVT
  - b. Intra-arterial injection.
A 55 year-old woman received injection for neurotoxin to her forehead for static dynamic creases, and you decide to add a little hyaluronic acid to correct a deep vertical crease in her glabella.

Immediately upon completion of injecting filler, she begins to complain of excruciating pain.

- You think it is injection pain, and wait a few minutes, but it doesn’t remit much.
- Also, the patient begins to complain that she is dizzy and can’t see well from her left eye, which has gone dark.
CASE 1:
FILLERS AND IMMEDIATE PAIN

- You think the patient may be a little hypersensitive, and maybe needs to lie down for a while in Trendelenburg. She may be having a vasovagal reaction.

- Questions:
  - Is this an appropriate response?
  - What happened?
  - What is your next step in management?
CASE 1:
Retinal Artery Thrombosis

- Multiple case reports of vision loss from soft tissue augmentation:
  - 15 reports of blindness following cosmetic facial fat tissue transfer
  - 17 patients who suffered transitory (3 cases) or permanent (14 cases) blindness following the injection of corticosteroids, paraffin, silicone oil, bovine collagen, polymethylmethacrylate, hyaluronic acid and calcium hydroxyapatite.

Retinal Artery Thrombosis: Clinical Presentation

- Excruciating pain and a sudden blackout of the involved eye.
- Pain does NOT remit within a few minutes of injection and is not relieved by massage of area.
- An additional few reported cases presented with further neurologic complications caused by cerebral vessel embolus.

Retinal Artery Thrombosis: Mechanisms of Injury

- Central retinal artery embolization is related to the retrograde movement of filler from peripheral vessels into the ophthalmic arterial system proximal to the central retinal artery.
- Microemboli may develop and imbed into end-arterioles in retina
- Theoretically, higher injection pressure may cause the retrograde migration of the column in the internal carotid artery, permitting cerebrovascular embolization and stroke.

Retinal Artery Thrombosis: Immediate Referral to Ophthalmology

- Early recognition and treatment are essential for treating ocular circulation emboli.

- The goal of treatment is rapid restoration of perfusion to the retina and optic nerve head.

- After 90 minutes, the damage caused by retinal ischemia becomes irreversible and retinal necrosis occurs.

- No reliable, effective treatment after acute phase.
Retinal Artery Thrombosis: Treatment

- In the European Assessment Group for Lysis in the Eye study, the standard treatment of central retinal artery occlusion included a multi-step therapy with 60% improvement in vision:
  - Topical (a single eye drop of timolol 0.5%) and
  - Systemic (IV 500 mg of acetazolamide) lowering of intraocular pressure
  - Isovolemic hemodilution (hematocrit >40 %)
  - Globe massage
  - Anticoagulation with heparin and acetylsalicylic acid

Schumacher M, Ophthalmology 2010
Retinal Artery Thrombosis: Prevention

- Convey risks to patient and elicit history of any issues in the past with intravascular injection.
- Aspiration before injection – avoid red flash (small bore)
- **Superficial injection with tenting of the dermis**
- Very slow injection
- Small gauge needles or microcannulae are preferred
- The total volume of filler injected during the entire treatment session should be limited, and injections into pretraumatized tissues should be avoided.
Retinal Artery Thombosis: Consider Use of Cannulas

Non-sharp annulas are less likely to perforate small vessels, but care must still be applied in terms of depth, speed, and volume delivered.
The risk of an acute adverse event increases quickly above flows of 0.3 mL/min, after which forward pressure exceeds intravascular pressure and filler enters vessels easily.
Negligence Lawsuit

- Duty
- Breach of Duty
- Causation
- Damages
Negligence Lawsuit

- Duty

- 1) Technique
- 2) Recognition of event
- 3) Treatment

- 4) Consent
Negligence Lawsuit

- Breach of Duty

1) Improper Technique
2) Non-recognition of event
3) Lack of available supplies (timolol 0.5%, IV 500 mg of acetazolamide and heparin)
4) Consent
Negligence Lawsuit

- Causation/Damages

1) Blindness
CASE 2: PERIORAL FILLERS AND PAIN

- A 35 year-old woman receives hyaluronic acid injections to her marionnette lines and the upper junction of her nasolabial folds. Only 1 cc of total volume is injected.
- As the patient dislikes the feeling of being numb all over for hours, she declines a nerve block, relying just on the lidocaine premixed with the filler.
- The injection hurts more than usual, and the patient complains of pain after the injection is completed.
- The pain does not decrease rapidly after the injection, and after 10 minutes of observation, the area is still red and tender. You are busy in another room, but as the patient says she is feeling a little better, the nurse discharges her home.
CASE 2: INTRAVASCULAR OCCLUSION

- Due to interruption of the vascular supply to the area by direct injury of the vessel, compression of the area around the vessel, or obstruction of the vessel by the filler.
- Incidence in patients undergoing filler injections, ~9/10,000 patients, and may be much higher.
- Perinasal and glabella areas are at highest risk.

Intravascular Occlusion from Filler: Clinical Presentation

- No immediate effect except prolonged pain and possibly slightly more erythema than normal.
- On careful examination, unilateral prolonged blanching may be visible, and distinguishable from blanching due to lidocaine.
- 6-24 hours after injection, necrosis may be evinced as 6 hours dusky purple discoloration or reticulated erythema.
Intravascular Occlusion from Filler: Clinical Summary

- Rare but more common with viscous fillers, CaHa and HAs, than PLLA
- Usually resolves with modest pigmentation and surface irregularity
- Can cause necrosis, slough, disfiguring scar
Intravascular Occlusion from Filler: Risk Due to Vascular Watershed

• STUDY TYPE: Review and case series

• METHODS: Anatomic risk areas for vas-occlusion reviewed; cases of compromise discussed; methods of treatment suggested.

While vaso-occlusion after filler injection is uncommon, it is a potentially serious complication, risk areas include the supratrochlear artery (peri-glabella), the angular artery (medial cheek), the superior and inferior labial arteries(angle of mouth), and the parotid duct (upper second molar). Cohen and Brown, JDD, 2009
Intravascular Occlusion from Filler: Management

- When suspecting such an event, one should immediately discontinue injection.
- Massage and heat may induce vasodilation and help move filler that is clumped in one area.
- Topical nitroglycerin paste has been recommended but is of uncertain utility.
- If hyaluronic acid filler was used, inject 75-150 U of hyaluronidase combined with 1.5 - 3.0 mL of saline at various depths throughout the area of injection issue.
Negligence Lawsuit

- Duty
- Breach of Duty
- Causation
- Damages
Negligence Lawsuit

- Duty
- 1) Consent
- 2) Technique
- 3) Recognition of event
- 4) Treatment
Negligence Lawsuit

- Breach of Duty

1) Lack of consent
2) Improper Technique
3) Non-recognition of event
4) Lack of available supplies (nitroglycerin paste/hyaluroindase)
Negligence Lawsuit

- Causation/Damages

1) Scar
A 40-year old woman with injection of the lips with fillers for augmentation complains right after the injection that she can feel something hard on one side and it feels lumpy.

You massage the area, look at it carefully, and discharge her to home.

One week later she returns, once the swelling from the injection has worn off, complaining of a lump that you can see on one side and another inside her mouth that you can’t see.
CASE 3: NODULE FORMATION AFTER FILLERS

- Can occur after injection with ANY filler
- Eyelid and lid nodules more common with PLLA and CaHa: eyelids and lips are relative contraindications.
- Usually transient, or treatable
- Causes
  - Injection technique
  - Excessive bolus at one site
  - Injection into dermis
  - Injection into muscle
- True hypersensitivity reactions are rare, idiocyncratic and unpredictable, and reported with all fillers

Nodule from CaHA for Lip Augmentation

- NOT granulomas
- An aggregation of material due to the sphincteric action of the orbicularis oris muscle.
- Nodules treatable via massage, needle disruption of the nodules, or excision.
- Tzikas et al describe 1000 patients treated with CaHA
- 5.9% incidence of lip nodules overall
  - All resolved with or without intervention.
  - However, the incidence of nodule presentation was inversely related to injection experience over time.
  - Incidence declined to less than 2% for the last 100 lips treated.

Diffuse Perioral and Cheek Nodules After Filler Injection

- Centrofacial nodules after poly-L-lactate
  - Two cases referred by others-idiosyncratic
  - Resolution on oral prednisone, but came back when stopped
  - Serial injections with kenalog 5, monthly, x 2 years. Also with clindamycin/kenalog mixture.

- How did this happen?
  - Unclear if technique associated
  - Injection into muscle?
Persistent palpable subcutaneous papules or nodules at the injection sites characterize intermediate (months) and late (>2 years) adverse reactions.

Rates of nodule formation highly variable
- 0.05% - 51% reported
- Discrepancy due to:
  - Lack of a precise definition of subcutaneous nodules.
  - Difference in injection techniques
  - Differences in dilution volumes
- Low dilution (3:1) of PLA used in the early European studies was associated with high rates of late-onset nodules (1–12%).
- Higher dilution volumes (5:1–7:1) a/w lower rates (0.1–0.15%).

Diffuse PLLA Nodules: Postulated Mechanism

- Proposed theories include:
  - Excess PLA deposition
  - Local clustering of many PLA particles provoked by an unequal distribution due to lack of massage of the injected region
  - Incorrect depth of the injection and tracking of the material during needle withdrawal
  - Clustering of the large PLA particles (PLA microparticle sizes range between 10 and 125 μm)
  - Very-low-grade bacterial infection (no supporting evidence)
  - Differential response of various injection sites; incidence of late-onset nodules have been reported to be greater in certain areas such as periorbital skin and dorsal hands.

Treatment options for late-onset subcutaneous nodules include intralesional steroids, systemic steroids, systemic antibiotics, intense pulsed light, 5-fluorouracil, allopurinol, and surgical removal.

High doses of intralesional steroids (40–80 mg/mL) may be necessary for clinical resolution of late-onset nodules.
Xanthelasma Palpebrarum
Associated with HA Filler

  - After injection of HA under eyes, persistent redness.
  - By 3 months, this had become a yellow plaque.
  - Biopsy consistent with xanthelasma.
  - At this point, this is the sole case report.
What About Truly Permanent Fillers in General?

- **Artefill** (PMMA microspheres)
  - Has caught on slowly
  - Concerns about potential long-term immunogenicity, although the product has been refined over time
  - FDA approved

- **Silicone**
  - For intraocular tamponade after retinal detachment, used off-label
  - Given prior history of immunogenicity, use of microdroplet technique
  - Conservative practitioners may only use for HIV patients, and acne scarring
Laser Treatment Granulomas Due to Permanent Fillers

- Cassuto et al, Dermatol Surg, 2009

**STUDY TYPE:** Retrospective cohort study

**METHODS:** 20 patients nodules and granulomas associated with permanent fillers were treated with lasers for improvement.

Multiple laser treatments sometimes required, but overall improvement of nodules and granulomas associated with Dermalive and Artecoll.
Negligence Lawsuit

- Duty
- Breach of Duty
- Causation
- Damages
Negligence Lawsuit

- Duty
- 1) Consent
- 2) Technique
- 3) Recognition of event
- 4) Treatment
Negligence Lawsuit

- Breach of Duty
  1) Lack of consent
  2) Improper Technique
  3) Problem does resolve
Negligence Lawsuit

- Causation/Damages

1) ????
Negligence Lawsuit

- Duty
- Breach of Duty
- Causation
- Damages
Negligence Lawsuit

- Duty

- 1) Technique (Dilution)
- 2) Improper Injection Technique
Negligence Lawsuit

- Causation/Damages

1) Economic impact on job
CASE 4: BROW ASYMMETRY AFTER TOXINS

- A 30 year-old woman received neurotoxin injection for the first time for her forehead and glabella dynamic creases.
- One week later she calls saying her brow is lower on one side.
- What happened? How could this have been avoided? And what should you do?
Eyelid Ptosis After Neurotoxin Injection: Causes

- From diffusion of BT into the orbital septum
- From injection of large amounts
- From injections very close to the orbital rim
- From massages or intense manipulation of the treated area following the application.

The effects of compromise of levator palpebrae superioris muscle function.
Eyelid Ptosis After Neurotoxin Injection: Prevention

- Be conservative when treating older patients who may have a reduced or absent orbital septum.
- Avoid intense manipulation for a few hours.
- Inject the BTX precisely and with low volume.
- Do not inject at or under the mid brow.
- Understand Dysport/abo- diffuses further.
Eyelid Ptosis After Neurotoxin Injection: Treatment

- α-Adrenergic agonists ophthalmic eye drops, such as Iopidine 0.5% and Neosynephrine hydrochloride 2.5% are mydriatic agents.
  - This causes contraction of an adrenergic muscle, Müller's muscle, which is situated beneath the levator muscle of the upper eyelid.
  - This treatment will cause 1 to 2 mm of elevation of the lash margin
  - The treatment is symptomatic, and one to two drops three times a day must be continued to affected side until the ptosis resolves.
Eyelid Ptosis vs. Eyebrow Ptosis

- Brow ptosis is much more common
  - Can be avoided by not initially injecting lateral to the mid-pupillary line on the forehead, and treat Jack Nicholson look at 2 week follow-up if necessary.
  - No treatment except waiting if this happens
  - Even when this is not visible, “heaviness” may be reported and be troublesome to the patient

- Eyelid ptosis improves over time
  - Eyedrops are not a perfect cure, and patients are still frustrated
  - The ptosis usually gets better in weeks to a month, before the toxin wears off.
Eyelid/Brow Ptosis: Patient Reassurance

- The great thing about facial toxin injections is that they wear off.
- Within 3 months, the effect will be gone, completely.
Facial Asymmetry from Toxins: Unilateral Lip Droop

- Injections into inappropriate points may compromise the zygomatic major and levator labii superioris muscle, causing ptosis of the upper lip and the corners of the mouth, difficulties in mouth movements, and asymmetry.

- Avoidance:
  - Inject extremely small amounts periorally
  - Inject perfectly symmetrically lateral to midline
  - Do not inject in this area in fastidious patients
Negligence Lawsuit

- Duty
- Breach of Duty
- Causation
- Damages
Negligence Lawsuit

- Duty
  - 1) Consent
  - 2) Technique
  - 3) Recognition of event
  - 4) Treatment
Negligence Lawsuit

- Breach of Duty

1) Lack of consent
2) Improper Technique
3) Non-recognition of event
4) Lack of available supplies (iopidine 0.5% and Neosynephrine hydrochloride 2.5%)
Negligence Lawsuit

- Causation/Damages

1) ??? Look goofy
CASE 5:
BURNS FROM LASER/ENERGY DEVICES

- A 42 year-old Fitzpatrick type IV/V Latino woman presented for hair removal at a spa.
- During the procedure she noticed intense pain, which was more than she had previously had during her past treatments.
- The operator reassured her that everything was fine.
- The next day the patient noticed that red, rectangular welts were persistent on her chin. Over the course of the weeks these ulcerated and oozed.
- What happened? What could have prevented this? And what should be done now?
Burns from Laser Hair Removal: Causes and Prevention

- Usually caused by:
  - Excessively high energies
  - Lack of adjustment for skin type (darker types require lower fluence and may require 1064 nm laser)
  - Haphazard placement of spots, and multiple passes
  - Failure of cooling (no DCD or no contact with sapphire window; or overcooling)
  - Inexperienced users in spas, especially with IPLs

- Prevention: Avoid the above

Configurate pigmentation is tell-tale sign
Burns from Laser Hair Removal: Epidemiology

- Hyperpigmentation is most common
  - Resolves spontaneously after erythema remits
  - May take many months to fade
- Hypopigmentation usually also resolves
  - May take longer
  - Complete remission may not occur
- Full thickness injury results in scar
  - This does no resolve
  - Treatment with PDL and fractionated laser may be indicated to treat
  - Patients may have anxiety about being treated with another laser
Full Thickness Skin Burn from Laser Resurfacing: Causes

- Multiple passes resulting in “heat stacking”
- Lack of understanding that CO2 resurfacing has no clinical endpoint and must be preplanned
- Excessive reliance on proportion of skin parameters provided by fractionated laser manufacturers---these are based on physics not biology, and heat diffuses laterally.
- Pre-existing healing problems in patients
- Cooling failure with non-resurfacing lasers

Nouri Chapt 9
Full Thickness Skin Burn from Laser: Clinical Outcomes

- Grossman et al - 20 pts over 17 mo period with:
  - 2 full thickness burns (1 - full face)
  - 2 cases of microstomia (2/2 perioral contracture from CO₂)

- Ulceration from laser use may occur with:
  - Aggressive tx parameters, inadequate cooling, device failure, poor pt selection
  - Seen in setting of Nd:YAG use for PWS and hemangiomas
  - Often seen with CO₂ laser resurfacing
Full Thickness Skin Burn from Laser: Prevention

- NO overlapping pulses/pulse stacking
- Adequate cooling with lasers
- Preplanned number of passes
- Conservative treatment even with fractional lasers
Full Thickness Skin Burn from Laser: Treatment

- Topical steroids to help with re-epithelialization acutely.
- Consider culture and appropriate antimicrobials.
- Meticulous wound care and routine follow-ups
- Treatment after re-epi complete
  - Pulsed-dye laser for redness
  - Injection of kenalog into hypertrophic scars
  - Fractional resurfacing with nonablative laser
  - In severe cases, skin grafting may be necessary
Negligence Lawsuit

- Duty
- Breach of Duty
- Causation
- Damages
Negligence Lawsuit

- Duty
- 1) Consent
- 2) Technique
- 3) Recognition of event
- 4) Treatment
Negligence Lawsuit

- Breach of Duty

1) Lack of consent
2) Improper Technique
Negligence Lawsuit

- Causation/Damages

  1) Scarring and permanent pigmentary changes
CASE 6:
LASER EYE INJURY

- A 42 year-old Fitzpatrick type IV/V Latino woman presented for hair removal at a spa.
- During the procedure she noticed intense pain, which was more than she had previously had during her past treatments.
- The operator reassured her that everything was fine.
- The next day the patient noticed that red, rectangular welts were persistent on her chin. Over the course of the weeks these ulcerated and oozed.
- What happened? What could have prevented this? And what should be done now?
A 42 year-old Fitzpatrick type IV/V Latino woman presented for hair removal at a spa. During the procedure she noticed intense pain, which was more than she had previously had during her past treatments. The operator reassured her that everything was fine. The next day the patient noticed that red, rectangular welts were persistent on her chin. Over the course of the weeks these ulcerated and oozed.

What happened? What could have prevented this? And what should be done now?
CASE 6: LASER EYE INJURY

- While undergoing laser epilation with 810 nm diode laser for his unibrow, your patient begins to complain of bright flash of light followed by sudden ocular pain.

- What took place?
Nd:YAG Laser Injury to Retina

(A) OCT at 1-week follow-up showing a cross-sectional view of the retina, demonstrating damage to the fovea (circled)—the central area of the macula that is responsible for sharp central vision.

(B) Retinal photograph corresponding with OCT image showing injury.

Scollo, Occup Med, 2014
Laser Eye Injury: Clinical Presentation

- Symptoms: sudden, severe decreased vision in one or, less commonly, both eyes.
- Bright flash of light (even with invisible laser beams), followed by an immediate decrease in the vision of affected eyes.
- Occasionally loud popping sound heard during a Q-switched chorioretinal laser injury.
- Vision may improve over several days to months.
- Corneal abrasion from rubbing may be attributed to laser exposure.
- Floaters also attributed even to PDL laser; need to be checked for retinal detachment.
Laser Eye Injury: Specific Structures Involved

- Thermal, mechanical, and photochemical damage to ocular structures caused by lasers include corneal burns, uveitis, cataract formation, and retinal burns.
- Uveal tissue damage, specifically damage to the iris.
- Other iris damage such as posterior synechiae, pigment dispersion, and iris transillumination defects in patients who had undergone laser photoepilation to periorcular tissues has been described.
- Secondary open-angle glaucoma.

Laser Eye Injury: Causes and Prevention

- **Causes**
  - Laser radiation can damage the eye by photomechanical, photothermal, or photochemical mechanisms.
  - Corneal, vitreous, retinal injuries can occur.
  - Most ocular laser accidents are caused by Q-switched lasers, especially Nd:YAG, which can cause retinal injuries.
  - Periorbital treatment with hair removal devices is also an issue.
  - Reflectance of light around eyes can be a risk even if eyes are not targeted.

- **Prevention**
  - Laser eye injuries can be prevented by appropriate laser safety eyewear use.
  - Have a checklist to make sure all are wearing eyewear.

## Laser Eye Injury by Wavelength

<table>
<thead>
<tr>
<th>Spectral Region (Wavelength)</th>
<th>Biologic Effects in the Eye</th>
<th>Biologic Effects in the Skin</th>
</tr>
</thead>
<tbody>
<tr>
<td>UV-C (200–280 nm)</td>
<td>Photokeratitis</td>
<td>Erythema</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Skin cancer</td>
</tr>
<tr>
<td>UV-B (280–315 nm)</td>
<td>Photokeratitis</td>
<td>Increased pigmentation</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Accelerated aging of the skin</td>
</tr>
<tr>
<td>UV-A (315–400 nm)</td>
<td>Photochemical cataract</td>
<td>Pigment darkening</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Skin burn</td>
</tr>
<tr>
<td>Visible (400–780 nm)</td>
<td>Photochemical and thermal retinal injury</td>
<td>Photosensitive reactions</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Skin burn</td>
</tr>
<tr>
<td>IR-A (780–1400 nm)</td>
<td>Cararact</td>
<td>Skin burn</td>
</tr>
<tr>
<td></td>
<td>Retinal burn</td>
<td></td>
</tr>
<tr>
<td>IR-B (1400–3000 nm)</td>
<td>Cataract</td>
<td>Skin burn</td>
</tr>
<tr>
<td></td>
<td>Corneal burn</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Aqueous flare</td>
<td></td>
</tr>
<tr>
<td>IR-C (3000 nm–1000 μm)</td>
<td>Corneal burn only</td>
<td>Skin burn</td>
</tr>
</tbody>
</table>

Pierce, Jennifer; Lacey, Steven; PhD, CIH; Lippert, Julia; Lopez, Ramon; Franke, John; Colvard, Michael
DOI: 10.1097/JOM.0b013e318236399e
Negligence Lawsuit

- Duty
- Breach of Duty
- Causation
- Damages
Negligence Lawsuit

- Duty
- 1) ? Consent
- 2) Technique
- 3) Recognition of event
- 4) Treatment
Negligence Lawsuit

- Breach of Duty
  1) Lack of consent
  2) Improper Technique
Negligence Lawsuit

- Causation/Damages

1) Vision problems
CASE 7: THROMBOEMBOLISM FROM SCLEROTHERAPY

- A 58 year-old woman presents for a one week follow up s/p sclerotherapy to her lower legs for telangiectatic veins.
- She reports soreness of her right lower leg and you notice redness, tenderness and edema.
- What is your next step? What took place?
CASE 7: DVT/PE FROM SCLEROTHERAPY

- Thrombus blocks flow
- Swollen red and tender
Sclerotherapy Associated Thromboembolism

- Deep venous thrombosis-
  - Clinical: unilateral LE edema, erythema, tenderness.
  - Diagnosis: Best using Duplex ultrasonography of the legs.
  - Suspect PE if concurrent pulmonary symptoms.

- Pulmonary Embolism:
  - Clinical: Pleuritic chest pain in absence of dyspnea.
  - A low-grade fever may occur (with pulmonary infarction)
  - Diagnosis: ventilation–perfusion scanning or helical CT.
    - ancillary test: D-dimer.

Thromboembolism in Sclerotherapy: Incidence

- Deep vein thrombosis and thrombophlebitis occur with both foam and liquid sclerotherapy.
- Jia et al performed a systematic review of foam sclerotherapy and reported that severe complications were very rare and were reported as stroke and transient ‘embolic’ events.
  - one pulmonary embolism in 1316 patients reviewed
- The incidence of DVT varies in different studies, 0.02–5.7 %
- Phlebitic irritation in the treated area after foam sclerotherapy occurs in ~10 % of patients.
- Incidence of stroke substantially lower, ~0.01%.
  - 13 published cases of stroke

Thromboembolism in Sclerotherapy: Risk Factors

- Cardio-pulmonary right-to-left shunts, patent foramen ovale.
  - Increase risk of stroke, myocardial infarction, other arterial events, visual disturbance and headache.
- Migraine headaches (with aura).
- The prevalence of PFO is ~10%.
- Other factors that appear to play a role in frequency of DVT as a complication of sclerotherapy.
  - Experience of the treating physician
  - Amount of foam applied
  - > 20 mL foam appears to increase the risk for DVT
  - History of prior DVT

Thromboembolism in Sclerotherapy: Risk Factors

Stucker M et al. Review of Published Information on Foam Sclerotherapy Dermatologic Surgery, Jun 2010
Thromboembolism in Sclerotherapy: Treatment and Prevention

- Patients with a history of DVT or PE should have Doppler ultrasonography of their legs prior to sclerotherapy.

- Some recommend effective anticoagulation prophylaxis with low-molecular-weight heparin and physical DVT prophylaxis with compression therapy (23 - 32 mmHg).

- Lower concentrations of sclerosant and lower volumes of foam should be used.

- Treatment of DVT and/or PE involves anticoagulation.

Negligence Lawsuit

- Duty
- Breach of Duty
- Causation
- Damages
Negligence Lawsuit

- Duty
- 1) Consent
- 2) Technique
- 3) Recognition of event
- 4) Treatment
Negligence Lawsuit

- Breach of Duty

1) Lack of consent
2) Improper Technique
3) Non-recognition of event
4) Lack of further treatment
Negligence Lawsuit

- Causation/Damages

1) Stroke
36-year-old woman is referred to you for evaluation of a purpuric plaque that developed on the inner aspect of the right thigh several hours following sclerotherapy with 0.5% polidocanol.

What is the cause of this appearance? What is the most appropriate management of this complication?
Intra-Arterial Injection of Sclerosant

- Unexpected and unpredictable venous-to-arterial connections in the precapillary circulation may allow intra-arterial passage of sclerosant from its initial venous entry.

- Incidence of intra-arterial injection:
  - Six patients (0.1%) during vascular surgery sustained inadvertent arterial injury, incidence was 0.06% (3 of 4,800) and of a mechanical nature amenable to repair. No tissue loss.
  - Injury during USGS (0.25%, 3 of 1,200) was of a chemical and irreversible nature. All three patients suffered tissue loss.

- Skin necrosis has been reported after incorrect application of the sclerosant liquid or foam, and the necessity for amputation after sclerotherapy has been described after incorrect arterial puncture.

- Arterial injury causing gangrene after foam sclerotherapy

Intra-Arterial Injection of Sclerosant: Severe Skin Injury

- Skin necrosis has been reported after incorrect application of the sclerosant liquid or foam
- Necessity for amputation after sclerotherapy has been described after incorrect arterial puncture.
- Arterial injury causing gangrene after foam sclerotherapy

Intra-Arterial Injection of Sclerosant: Initial Skin Effects

- Strong pain sensation usually occurs immediately after the injection.

- Ischemia, livedo racemosa and a possible necrosis.

- In more severe cases, after 24-72 hrs a first central demarcation and necrosis occurs.
Intra-Arterial Injection of Sclerosant: Treatment

- Vessel-dilating drugs (alprostadil, pentoxifyllin, nicotic acid) can be used to reduce the development of hemorrhagic necroses.
- Systemically non steroidal anti-inflammatory agents and steroids can be used to reduce inflammatory reactions.
- Possible infiltration of the affected area with procaine.
- Cool with ice packs.
- Anticoagulation
  - Immediate heparinization with fractionated heparin should be given and continued for 6 days.
  - Consider immediate IV heparin bolus.
  - Low molecular weight dextran (10 ml/kg for 3 days).
  - Consider use of a thrombolytic agent.
- In severe cases, arteriography and installation of vasodilators may be indicated.
Negligence Lawsuit

- Duty
- Breach of Duty
- Causation
- Damages
Negligence Lawsuit

- Duty
  - 1) Consent
  - 2) Technique
  - 3) Recognition of event
  - 4) Treatment
Negligence Lawsuit

- Breach of Duty

1) Lack of consent
2) Improper Technique
3) Non-recognition of event
Negligence Lawsuit

- Causation/Damages

1) Scar
Negligence Lawsuit

- Duty
- Breach of Duty
- Causation
- Damages

- Expert Witnesses
- Jury

- Nothing stops lawsuit from being filed
- Using reasonable “duty” lessens likelihood of losing lawsuit
Did We Get You Interested?

- Patient Safety in Dermatologic Surgery
  Hansen T, Lolis M, Goldberg D, MacFarlane DF.

  JAAD CME. 2016