2017 MID-ATLANTIC
CONFERENCE

7th ANNUAL CURRENT CONCEPTS IN
VASCULAR THERAPIES

2017

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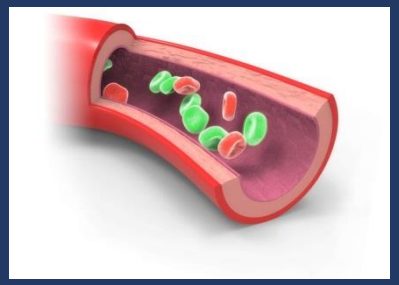
Spy Angioscopy: Vascular Uses

Disclosures

- None

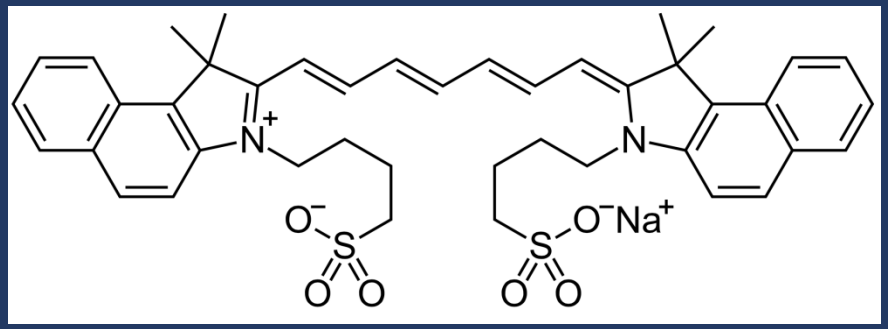
SPY angiography

- Also called fluorescent angiography
- A fluorescent dye Indocyanine Green (ICG) is injected intravenously: 5 mL of 2.5 mg/mL followed by a 10-mL normal saline flush
- A low level light source excites ICG and its fluorescence is captured in real-time and displayed on a monitor



Indocyanine Green

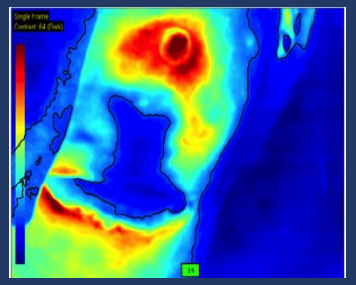
- Safe clinical record
- Tightly binds a plasma protein in the blood staying within the vasculature
- Excreted hepatically
  - not contraindicated in renal failure patients
- 3-5 min half life
- Only contraindication is iodide allergy



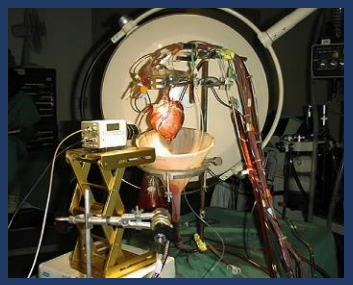
History

First used in the 1970's during retinal angiography

SPY used to assess skin perfusion in plastic surgery in 2007



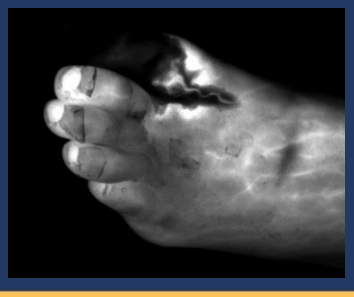
SPY fluorescence technology developed in 1999



SPY FDA cleared for organ transplant and GI procedures

SPY introduced to US market for cardiac surgery applications in 2005

SPY developed and introduced into wound care procedures in 2013



Information gained

- See the microcirculation: what the eyes can't see
- Are there any areas devoid of perfusion
- Impact of revascularization on perfusion
- Did revascularization target the intended angiosome
- When is maximal "peak" perfusion post revascularization in order to plan ideal podiatric procedure timing
- Is a flap viable
- Is closure on too much tension

Literature

JOURNAL OF VASCULAR SURGERY
May 2013

Early quantitative evaluation of indocyanine green angiography in patients with critical limb ischemia

Jonathan D. Braun, MD, Magdiel Trinidad-Hernandez, MD, Diana Perry, BS, David G. Armstrong, PhD, DPM, MD, and Joseph L. Mills Sr, MD, *Tucson, Ariz*

- Flourescent angiography in 24 patients from 2011-2012 with CLI (26 limbs) after revascularization (13 patients pre and post intervention
- Ingress, ingress rate, curve integral, egress, egress rate, end intensity
- All variables increased significantly after revascularization

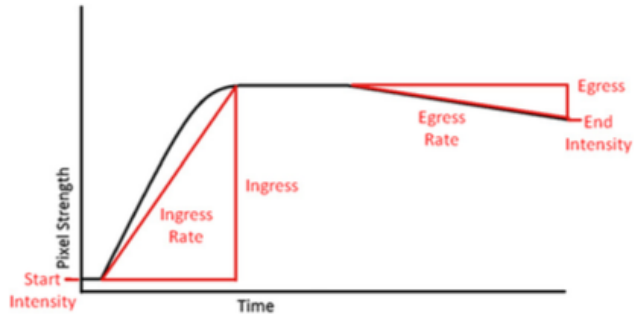


Fig 1. Indocyanine green angiography (ICGA) parameter definitions are represented graphically. See text for full definitions.

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- Standardize protocol

Table I. Indocyanine green angiography (ICGA) protocol

- Clear the patient of contraindications.
- Position the camera head perpendicular to the area of interest, adjusting bed height if necessary.
- Reconstitute 12.5 mg indocyanine green in 5 mL normal saline.
- Remove any dressings and extinguish overhead lights.
- Push 5 mL intravenously and immediately flush with normal saline.
- Start the buffering once the indocyanine green is administered and start capture when a blush appears on the screen. Capture the full sequence of 136 seconds without moving the camera or area of interest. Afterward, capture sequences of any other tissue that is relevant.
- Return the patient and machines to the original position.

Clinical Applications

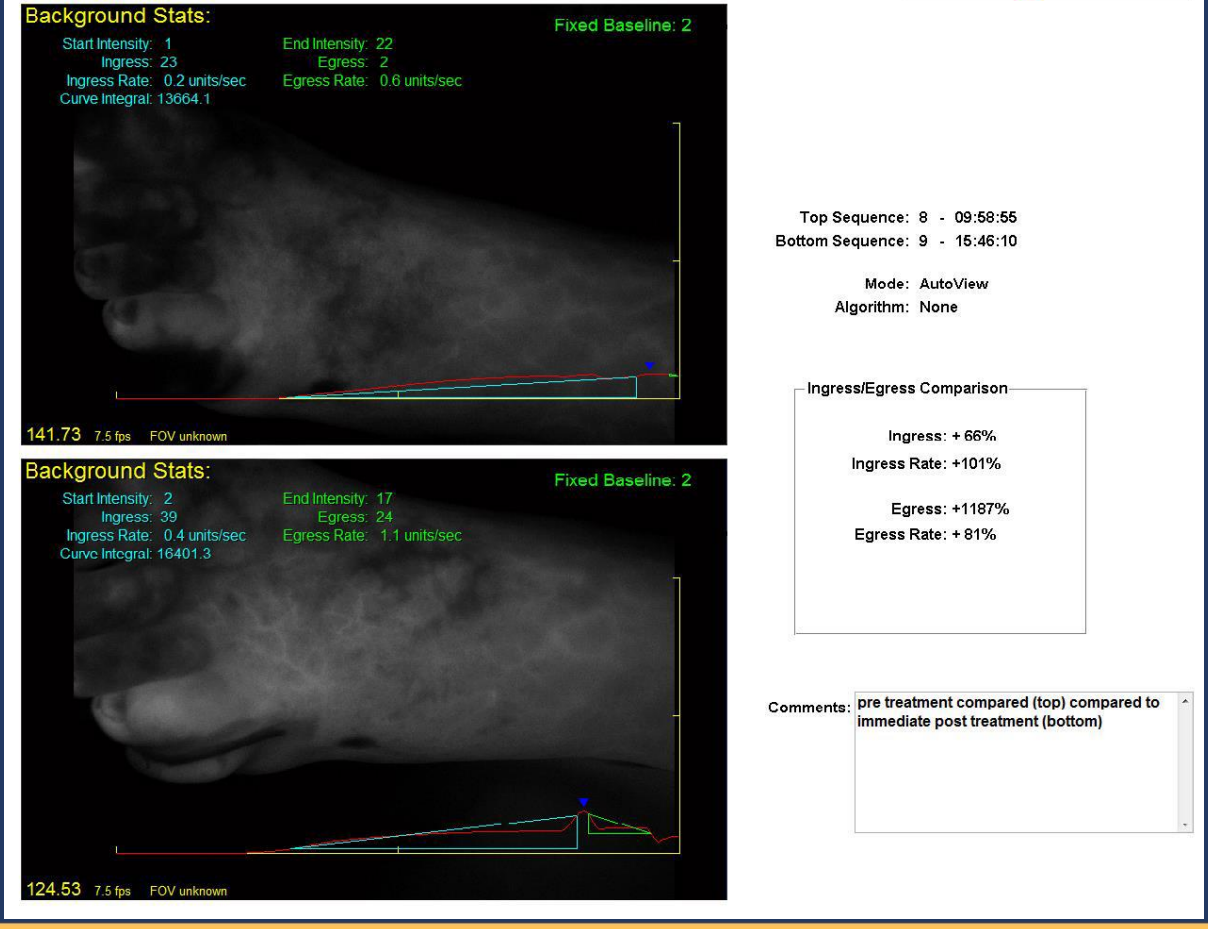
- Pre and post vascular intervention
- Amputation level
- Wound healing
- Flap viability
- Perfusion at incision closure sites

Pre and Post Vascular Intervention

- 72yo male with PAD and ulcer between left toes 4/5 and base of 5

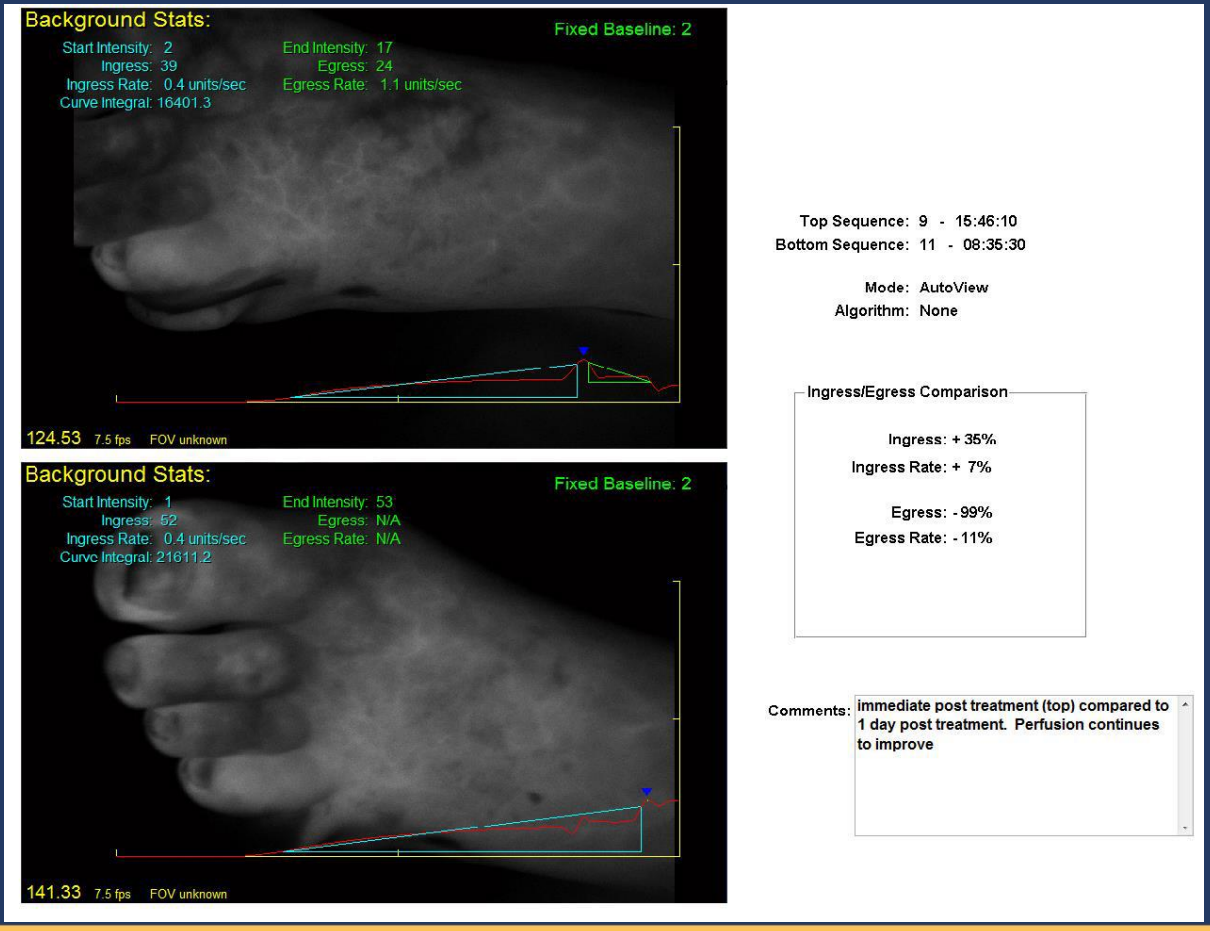
Pre and Post Vascular Intervention

- Angiogram with left external iliac stent
- Compare pre and post intervention images



Pre and Post Vascular Intervention

- Compare immediately to 1 day post intervention
- Post interventionday 2 5th toe amputation
- Subsequently healed and ambulating



Amputation level

- 65yo diabetic male with PAD with ulceration of 1st and 5th toe
- On visual inspection middle 3 toes viable
- Vascular ultrasound: non compressible arteries with flatline 1st toe waveforms
- Toe amputation versus TMA versus BKA

Amputation level

- Fluorescence angiography demonstrated poor perfusion to all digits except medial half of 1st toe even after vascular intervention

Amputation level

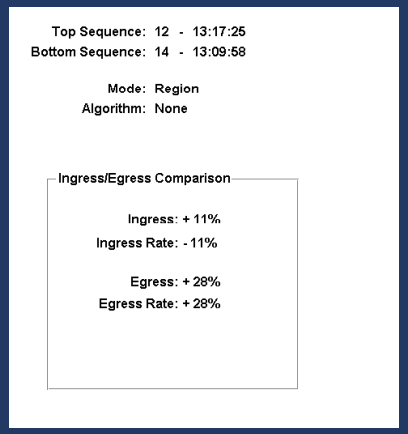
- TMA performed
- Healed at 2 month follow up
- Ambulating without difficulty

Wound healing

- 81yo male with chronic venous insufficiency with recurrent right malleolar venous ulcer and cellulitis
- Venous and perforator ablation
- Weekly unna boots

Wound healing

- Post Debridement
- Serial SPY angiography
- Dermal substitute application
- 4 weeks then 12 weeks post application
- Eventually heals in 16 weeks



Flap viability

- TMA posterior flaps
- BKA posterior flaps
- Similar application as with plastic surgery

Perfusion at incision closure sites

- 85yo male with PAD and gangrenous non salvagable foot
- Intraoperative SPY angiography after below knee amputation

Perfusion at incision closure sites

- Suggestion of poor perfusion from closure
- Half of sutures removed with improvement in perfusion

Conclusions

- Assess perfusion in relation to surrounding structures
- Assess perfusion over time and after interventions
- Aid in decisions regarding limb preservation and/or amputation
- Assessing wound healing