Intraoperative Near Infra-Red Spectroscopy (NIRS) Monitoring in Lower Limb Revascularization Using Indigo System

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What is “NIRS”?

Near Infra-Red Spectroscopy is a device generally used to evaluate real time cerebral oxymetry during carotid endarterectomy and stenting through the proportion of light attenuated in the wavelength range from 730 to 810 nm with subsecond temporal resolution.
What is “NIRS”?

The monitoring system that we used is composed by a monitor with real time oxygenation values, connected by wire with two reading sensors placed on the patient.
Design of the study

- Prospective, observational and descriptive single-center case series
- From September 2015 to June 2016
- 6 patients affected by acute lower limb ischemia, admitted for emergent revascularization procedures
- All interventions were performed by experienced Interventional Radiologists on a biplane flat plane panel angiographic system
- The endovascular procedures were performed through local anesthesia via anterograde ipsilateral femoral artery access, and recanalization was achieved with the Penumbra Thromboaspiration System (Penumbra, Inc., Alameda, CA, USA).
Indigo System

- Aspiration Catheters in 4 sizes – CAT3, 5, 6 & 8
- Max Pump provides -29 mmHg of continuous vacuum
- Proprietary separator technology to clean the catheter lumen for continuous aspiration
Aspiration Catheters

CAT Compatibility Chart

CAT 3

CAT 5

CAT 6

CAT 8
CAT6 / SEP6

- 7 Material Transitions
- 6F OD (6F sheath compatible)
- 5.4F Aspiration Lumen
- 135cm length for distal reach
Acute limb ischemia treatment

During a revascularization:

- When we have to stop the procedure?

- When should we associate thrombolytic infusion?

- When the angiographic result is enough to guarantee a good clinical outcome
Regular Sensors placement
Feet Sensors placement
Oxygen saturation as measured by near-infrared spectroscopy (NIRS) at the foot before and after endovascular procedures in ischemic legs of patients.

<table>
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<th>Patient no.</th>
<th>Ischemic leg, initial</th>
<th>Ischemic leg, final</th>
<th>Contralateral leg, initial</th>
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Clinical Case 1

- Female
- 67 years old
- Massive pulmonary embolism secondary to DVT
- V-A ECMO to restore the blood oxygenation
- Surgical PTE to “clean” the pulmonary arteries
Case 1

Main arterial catheter

Distal perfusion catheter
Case 1
Case 1
Case 1

Cat6 in ATA
Case 1
Case 1
Case 1
CASE 1
Case 2 bypass occlusion
Case 3: Posterior Tibial Artery occlusion
TAKE HOME POINTS

In the present pilot series, we demonstrated the feasibility of NIRS monitoring as a clinical application that investigates the distal flow in patients during lower limb revascularization procedures.
TAKE HOME POINTS

With

**INDIGO SYSTEM,**

we obtained optimal flow restoration in all patients

without needing adjuvant pharmacologic therapy
In our small case series we found an association between the real-time intraoperative peripheral oxygenation status and the clinical evolution or regression of the distal ischemia that shows us the way for the: 

BEST CLINICAL OUTCOME
THANK YOU
For your Attention
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