

Peripheral Nodule Dye-Marking with the MONARCH® Platform

Dr. Gustavo Cumbo-Nacheli

CASE STUDY



Fig 1. CT scan showing peripheral nodule with no bronchus sign

BACKGROUND

A 47-year-old female patient with a previous diagnosis of a right knee malignant peripheral nerve sheath tumor, confirmed neurofibromatosis presented with a 10cm nodule on her right lung; suspicious for metastatic malignancy. The lesion was not expected to be palpable and a dye-marking procedure using the MONARCH® Platform was requested prior to robotic resection.

PROCEDURE & TECHNIQUE

One pathway was created and used to navigate near this nodule, which was small (10mm) and in a difficult area to access in the lung with no visible bronchus sign coming within several centimeters of the target (**Fig.1**). Once the MONARCH® bronchoscope was navigated to a satisfactory location in close proximity to the target (**Fig.2**), fluoro was used to verify location, and a 19g Olympus PeriView FLEX needle was used to deliver the dyes into or near the lesion. The needle was inserted through the MONARCH bronchoscope using fluoroscopic guidance, and then extended from its sheath. Using a 1.0cc slip-tip syringe, 0.75cc methylene blue was injected without an air chaser. The needle was not primed with dye prior to inserting it into the scope to prevent leakage. Next, leaving the scope and needle in place, and using a separate 1.0cc slip-tip syringe, 0.75cc indocyanine green was injected under fluoroscopic guidance and without an air chaser. This technique was developed at the cardiothoracic surgeon's request, who finds that this combination of dyes at these doses provides adequate visualization of the area of interest without over-dyeing the area. Effective dye was placed within 1cm of the nodule and robotic resection was performed (**Figs.3-5**).

NODULE CHARACTERISTICS

Lobar Location
Right upper lobe, apical segment

Size
10mm nodule

Bronchus sign
No

Fluoro
Invisible

Time to targeted location
00:06:00

Procedure Time
00:10:00

Instruments used
2cm, 19g flexible TBNA needle

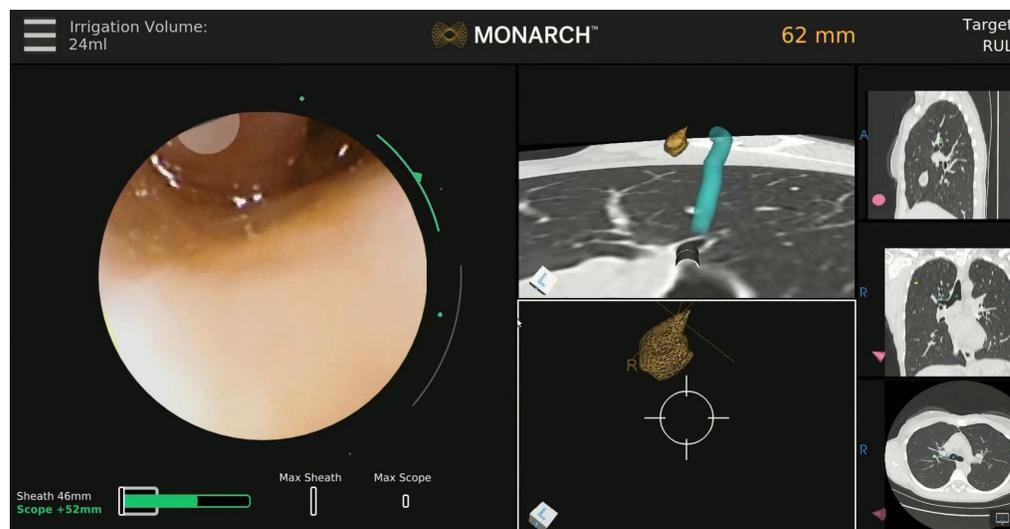


Fig 2. MONARCH live camera view and deployment of needle in targeted direction



The Fused Navigation Technology equipped in the MONARCH® Robotic platform allowed me to precisely dye a nodular area of concern several centimeters away from the nearest airway.

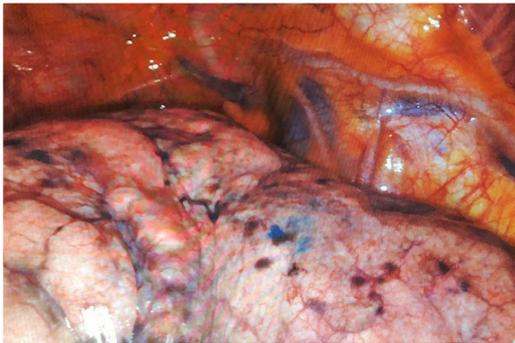


Fig 3. Methylene blue pleural tattoo during resection

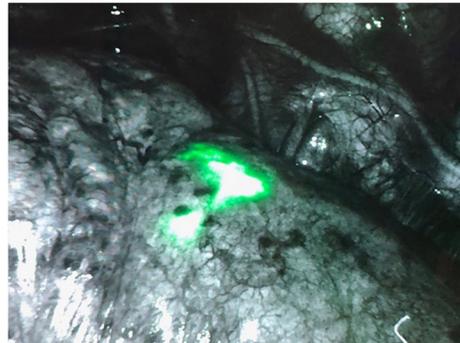


Fig 4. Indocyanine green tattoo during resection



Fig 5. Resected lung with dye

CONCLUSIONS

The Fused Navigation Technology equipped in the MONARCH® Platform allowed me to precisely dye a nodule area of concern several centimeters away from the nearest airway. Tissue analysis reported metastatic malignant peripheral nerve sheath tumor surrounded by adequate margin in the resected specimen.



About Dr. Gustavo Cumbo-Nacheli

Dr. Cumbo-Nacheli is an Interventional Pulmonologist at Spectrum Health, Michigan

Indications for Use: The MONARCH® Platform and its accessories are intended to provide bronchoscopic visualization of and access to patient airways for diagnostic and therapeutic procedures.

Important Safety Statement: Complications from bronchoscopy are rare and most often minor, but if they occur, may include breathing difficulty, vocal cord spasm, hoarseness, slight fever, vomiting, dizziness, bronchial spasm, infection, low blood oxygen, bleeding from biopsied site, or an allergic reaction to medications. It is uncommon for patients to experience other more serious complications (for example, collapsed lung, respiratory failure, heart attack and/or cardiac arrhythmia).

