Second Window ICG Imaging in Brain Metastasis

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Disclosures

- Buch - no disclosures
- Lee - owns stock options in VisionSense™
Fluorescent guided surgery offers potential for improved surgical resection.

Pioneered a novel technique relies on passive delivery of indocyanine green (ICG)

Accumulation via the enhanced permeability and retention effect (EPR).

SWIG can provide improved localization, identification and ultimately surgical resection of brain metastasis.
Methods

- 20 patients with intraparenchymal brain metastases enrolled.

- Subjects injected intravenously with 5mg/kg ~24h prior surgery.

- Near infrared camera used to identify tumor and inspect surgical resection margins.

- Final pathology was correlated with near infrared signal.
Example Case:

- 69 year old male
- Showed a lung mass and concerning adenopathy.
- Has metastatic small cell lung cancer
- Right frontal metastasis
Results (1)

- SWIG technique results in strong NIR fluorescence within brain metastasis

- All twenty metastases demonstrated NIR fluorescence intraoperatively.

- Average signal-to-background ratio (SBR) of 6.7 ± 3.1.
Results (2)

- Because NIR has longer wavelength than visible light, brain metastases can be localized through the dura and normal brain.
  - Average SBR signal was 60.5% of the final SBR.
  - NIR signal could be visualized through normal brain parenchyma up to 7 mm.

- Multiple margin specimens (n= 28) in addition to the 17 primary tumor specimens were obtained.
  - Sensitivity and PPV of NIR intraoperative imaging for tumor was 94% and 76%.
Conclusion

- Second Window ICG relies on the passive accumulation of dye in abnormal tumor tissue via EPR effect.

- Provides strong signal-to-background ratio in the near-infrared which can localize tumors prior to dural opening and prior to corticectomy.

Dr. Lee and his research team at the historic Pennsylvania Hospital