Nurse Guidelines

Fluorescence Guided Imaging Preparation & Troubleshooting

Fluorescence Guided Imaging & Indocyanine Green

General Concepts

- Fluorescence guided imaging (FGI) is a surgical tool implemented to improve the operating field imagery feedback and provided real-time guidance of target anatomy.
- This technique operates through the fluorescent dye, indocyanine green (ICG).
- Indocyanine green (ICG) is a dye and optical imaging agent indicated for fluorescence guided surgery, which includes but is not limited to: Ophthalmic-, foregut-, bariatric-, hepatobiliopancreatic-, colorectal-, endocrine-, plastic-, gynecologic-, cardiothoracic-, pediatric-, genitourinary-, oncologic-, and neurosurgery.
- Its applications focus on the optical enhancement of micro- and macro-vasculature, blood flow, target tissue perfusion, and tumoral and sentinel lymph node isolation and identification in the presence of malignancies.
- The technique can be performed via hand-held devices for open procedures, or totally endoscopic devices for laparoscopic or robotic-assisted procedures.

Pharmacokinetics & Posology

- The ICG dye is relatively innocuous, and its tandem-device applications render no radiation. Nevertheless, the operating room nurse and other personnel should be aware of its general pharmacology.
- The standard presentation for the United States and the America's is a powdered vial of 25 mg of ICG. See the '*Precautions*' section.
- The metabolism of ICG is hepatic, with a percentage disappearance rate in healthy subjects of 18-24% per minute.
- Normal biological half-time is 2.5-3.0 minutes.
- **Adults max dose**
    - Do not exceed a maximum total dose of 2 mg/kg
- **Infants, children, and adolescents max dose**
    - Do not exceed a maximum total dose of 2 mg/kg
- **Contraindications**
    - Relative contraindication: ICG contains sodium iodide and should be used with caution in patients who have a history of allergy to iodides.

- **Warnings**
  - Anaphylactic deaths have been reported following ICG administration
  - Overall incidence of 0.05%
    - Reactions: Anaphylactic or urticarial reactions have been reported in patients with or without a history of allergy to iodides. If such reactions occur, treatment with the appropriate agents (e.g., epinephrine, antihistamines, and corticosteroids) should be administered.
- **Precautions**
  - ICG is unstable in aqueous solution and must be used within 6 hours.
  - The dye should be diluted and flushed, when indicated, with sterile water to avoid precipitation of the dye within the plasma.
  - The dye is stable in plasma and whole blood so that samples obtained in discontinuous sampling techniques may be read hours later.
  - Sterile techniques should be used in handling the dye solution as well as in the performance of the dilution curves.
  - The un-reconstituted (powder) dye may cling to the vial or lump together because it is freeze-dried in the vials.
- **Drug interactions**
  - Heparin preparations containing sodium bisulfate reduce the absorption peak of ICG in blood and, therefore, should not be used as an anticoagulant for the collection of samples for analysis.
- **Carcinogenesis, Mutagenesis, Impairment of Fertility**
  - No studies have been performed to evaluate the carcinogenicity, mutagenicity, or impairment of fertility.
- **Pregnancy**
  - Teratogenic Effects: Pregnancy Category C - can cause fetal harm when administered to a pregnant woman or can affect reproduction capacity.
- **Lactation**
  - It is not known whether this drug is excreted in human milk.
  - Caution should be exercised when ICG is administered to a nursing individual.

Preoperative Precautions

Circulator Nurse Tasks

Complete prior to patient entry into the operating room

1.	*OR table position*: Ensure position required for the procedure being performed. *IMPORTANT*: Account for external arms or table extensions for device placement (e.g. laparoscope or hand-held device stand).
2.	*Power sources: Check that all power sources are connected, and device units are switched* 'ON'.
3.	*Video connectors*: Check that screen displays and device being used are connected and transmitting signal correctly. *IMPORTANT*: Account for required cables (e.g. HDMI-to-HDMI, DVI-to-DVI, VGA-to-VGA, etc.).
4.	Ensure that video/imaging documentation sources are operational. Capture a small recording and an image to confirm.
5.	Complete ICG time-out checklist.

Scrub Tech/RN Sterile Equipment Tasks

1.	Check for drapes, external arms or stands associated with the intended device used for the procedure.
2.	Check for sterile cup, syringes, and needles availability in case of tandem '*in-field*' administration of ICG.
3.	Check laparoscope or hand-held device for clarity and vision.
4.	In the case of further '*in-field*' dilutions of the dye, check for availability of sterile water.

Intraoperative Troubleshooting

NO PICTURE ON MONITOR	Camera control or other components (displays, media hub, etc.) not on.	Make sure all power sources are activated and correctly plugged in.
NO PICTURE ON MONITOR	Cable connectors between device control unit and/or monitor not attached properly.	Cable should run from output on device to input on primary monitor. Use compatible cables for device and light source.
NO PICTURE ON MONITOR	Input selection on monitor or video peripherals not (displays, media hub, etc) selected.	Adjust input selection.

Operating Room Checklist

Date		**Medical Record Number**	
Lastname, Name			
D.O.B.		**Weight (kg)**	
Procedure			
ICG contraindications	Iodine allergies ☐ Mercury allergies ☐ Pregnancy ☐ Lactation ☐		

ICG TIME-OUT

	Yes	No
Confirmed patient identity	☐	☐
Is this a pediatric case	☐	☐
Confirmed procedure	☐	☐
NIR device in room	☐	☐
Device ready for recording including images and video	☐	☐
Sterile covers available for intended device	☐	☐
ICG dye in room	☐	☐
Confirmed ICG dosage	☐	☐
Further dilution required	☐	☐
Sterile water readily available for reconstitution *AND* flushing	☐	☐
Confirm site of administration (e.g.: Peripheral, intradermal, etc)	☐	☐
Industry contacts available in case of device/dye troubleshoot	☐	☐
Verbal confirmation for administration prior to local analgesia administration	☐	☐
Anaesthesia confirmed	☐	☐
Special considerations/Additional comments		