PROTOCOL FOR NURSE-LED INDOCYANINE GREEN ANGIOGRAPHY

This protocol does not override the individual responsibility of health professionals to make appropriate decision according to the circumstances of the individual patient in consultation with the patient and /or carer. Health care professionals must be prepared to justify any deviation from this guidance.

SCOPE:

The guideline outlines the minimum standard expected from clinical staff performing Indocyanine Green Angiography (ICG) as part of their duties within ophthalmology. The primary purpose of this policy is to ensure that practice is safe and based on best possible evidence.

This protocol is for use by the following staff groups:

- Ophthalmic Doctors.
- Ophthalmic Nurses.
- Medical photographers.

Lead Clinician(s)

July Linton	Junior Sister, Ophthalmology
Laura Knowles	Ophthalmic Nurse Practitioner
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Approved by Medicines Safety Committee on:	4th November 2019
Review Date: This is the most current document and is to be used until a revised version is available	4th November 2022

Key amendments to this guideline

Date	Amendment	Approved by:
August 2014	New guideline	
15/08/14	Approved by Chairman's action on behalf of MSC	Steve Graystone
05/12/16	Documents extended for 12 months as per TMC paper approved on 22nd July 2015	TMC
01/06/2017	Document reviewed with no changes	July Linton
December 2017	Sentence added in at the request of the Coroner	
November 2019	Minor amendments to document approved at Opthalmology governance and Medicines Safety Committee	MSC

Nurse-Led Indocyanine Green Angiography

INTRODUCTION:

This guideline:

- Covers the administration of ICG for the purpose of angiography in adult patients.
- Provides details of minimum qualifications and training in order to perform this procedure.
- States that staff must adhere to Trust policy and procedures at all times and must update their knowledge and proficiency constantly.
- Applies to all sites in the Worcestershire Acute NHS Trust (WAHT), where ICG is administered.

ICG is a water soluble, tricarbocyanine dye and contains no more than 5.0% sodium iodide. The intravenous injection comes as a sterile powder in a 25 mg vial and should be diluted with sterile water 5ml for injections. The normal dose administered is 25 mg in 5ml of sterile water. ICG is not metabolised after injection and is excreted solely by the liver and excretion by the kidneys does not occur.

It has been used widely in medical imaging, especially in measurements of liver blood flow and cardiac output.

The excitation and emission spectra and the absorption spectra of ICG make it useful in ophthalmic angiography. The peak absorption and emission of ICG lie in the infra-red (800-850 nm) where transmission of energy by the pigment epithelium is more efficient than in the region of visible light energy. ICG also has the property of being nearly 98% bound to blood protein, and therefore, excessive dye extravasation does not take place in the highly fenestrated choroidal vasculature. It is, therefore useful for imaging the choroidal vasculature when using appropriate filters in a fundus camera.

ICG is useful in the diagnosis and monitoring of a variety of chorioretinal diseases. ICG is most valuable for evaluation and treatment of occult choroidal vasculature in chronic central serous chorioretinopathy and polypoidal choroidal vasculopathy in wet age related macular degeneration. It is also useful for the assessment of inflammatory eye diseases affecting the choroid.

The dye takes approximately 6–8 seconds after injection to enter the eye through the ophthalmic artery. The dye then perfuses the choroid through the short posterior ciliary arteries and enters the retinal circulation through the central retinal artery.

Photographs of the fundus are then taken for up to 30 minutes after the dye is injected to visualise the choroidal circulation

Preparation:

It is extremely important to document a patient's medical history and obtain consent for the procedure. The history should elicit any dye allergies noted at a previous exposure or previous anaphylaxis reaction. A record of the patient's current medications should be made. Blood pressure should have been recorded at the time of booking the investigation and addressed if the patient's blood pressure was outside of the department's guidelines for intravenous procedures of 200/100).

While existing cardiovascular or renal disease is not a reason for withholding any angiography, this information may prove useful in terms of subsequent patient management particularly in the event of an allergic reaction. For patients with renal disease, a reduced dose of 2.5ml of dye is given (as per the recommendation of the Trust's Renal Consultant). If the patient is in the advanced stages of renal disease, the relevant blood tests should be requested by the requesting clinician and reviewed prior to the booking of the ICG.

If a patient is known to have a history of mild allergy from a previous dye test, such as itching, tingling, sneezing etc. the test will still be performed – but with appropriate precautions. These may include the administration of an oral antihistamine such as Chlorphenamine (Piriton) 4mg (to be prescribed by a Doctor), the possibility of giving a reduced dose of 2.5ml of indocyanine green dye, and monitoring the patient for at least 60 minutes after the injection. This should be decided by the Doctor requesting the test.

If such a patient is using a betablocker drug, this should be discussed with a Doctor before the investigation begins.

Serious adverse reactions are extremely rare. However, it is essential that the facilities for resuscitation with a standard protocol should be available. If a patient has a minor allergic reaction, observation for at least 60 minutes is recommended before they leave the unit, as more severe life threatening reactions may take time to develop.

DETAILS OF PROTOCOL

Indocyanine Green (ICG) Angiography procedure:

Consent, Prescribing and Documentation.

- A Doctor or Registered Nurse, who has been trained in taking consent for this procedure must obtain written consent (in accordance with the Trust's Consent Policy) having explained the rationale, procedure and possible complications. This consent form must be placed in the patient's records and sent off for scanning into eZ notes at the end of the clinic. The patient should be given the underlying copy for their own records.

- The patient must be given the ICG information leaflet prior to the procedure. As per the FFA Trust protocol.

- A Doctor or Nurse Practitioner must prescribe the ICG and water for injection on a request form: EZ Notes WR1410.

- The Doctor or Nurse must sign that they have administered the ICG and water for injection and complete the WAHT Peripheral Vascular Device (PVD form) and document any complications that may have arisen during the whole procedure.

- ICG can be performed simultaneously with FFA. In these cases, both protocols should be adhered to and caution exercised if the nurse (or anyone in the team) has any concerns.

- When this clinic is performed at WRH, a Doctor must be in the department due to the department being isolated from the main hospital.

- Any complications must be entered as an incident on DATIX according to Trust policy.

Contraindications and Cautions with respect to ICG:

- Prior to administration the patient must be assessed by the Nurse, who checks the consent and ensures that there are no contraindications to the use of ICG. Also, any cautions need to be evaluated before the decision is made to proceed.

- Common contraindications are allergies to ICG, sodium iodide or iodine. Allergy to foods containing iodine such as shell fish is also a contraindication.

- Caution must be exercised in hyperthyroidism and patients with benign tumours of the thyroid. Previous history of minor reaction to ICG. Also, if a patient has a predisposition to multiple allergies and if such patient is taking beta blocking medication. These patients are to be discussed with a Doctor prior to the investigation commencing.

- The Nurse should not proceed with the administration if they have any reservations about the suitability of the patient. In this case the patient should be referred to an appropriate Doctor for assessment.

EXCLUSIONS:

- Patients with previous anaphylaxis to intravenous ICG.

CAUTIONS:

The following patients will only be accepted for an ICG if the Consultant requesting the investigation has documented that they are aware of the situation.

- Pregnancy.
- Breastfeeding.
- Children under the age of 16.

EQUIPMENT REQUIRED:

All drugs and equipment required must have their expiry dates checked before use.

- Indocyanine Green Powder for injection 25mg vial
- Water for injections 3 x 5ml
- Blunt filter needle,
- 5ml or 10ml syringes x2,
- Non-sterile gloves,
- Apron,
- Disposable tourniquet,
- Chloraprep,
- Venflon cannula (20g or 22g,)
- Cannula Dressing,
- Gauze,
- Micropore/Surgical tape,
- Vomit bowl,
- Water to drink
- Chlorphenamine 4mg tablets (to be prescribed if required),
- Oxygen,
- Anaphylaxis pack,
- Emergency and resuscitation drugs,
- Adequate space to manage a collapsed patient.

ADMINISTRATION OF INTRAVENOUS INDOCYANINE GREEN DYE

ACTION	RATIONALE
1. Ensure that information leaflet has been provided. Obtain a medical history, including allergies and liver function and check consent form is signed. Ensure that a baseline Blood Pressure reading has been recorded on booking (normally prior to the day of procedure).	To ensure allergies and medical conditions are documented, the patient is fit, understands ICG and has given consent. Ensures that patients who have hypertension have been assessed and treated and are fit to undergo the procedure.
2. Explain the procedure and the effects of the dye to the patient. Answer any questions.	To promote patient understanding and to alleviate patient concerns.
3. Instil dilating eye drops as prescribed (on the request form).	To enable to photographer to obtain the best quality images. Advise patient in regards to disturbed vision and the effects of bright lights.
4. Hand hygiene as per Trust protocol.	Promote patient safety and prevention of

	transmission of infection.
5. Prepare the relevant equipment.	To ensure that everything required (and that may be needed) for the procedure is available.
6. Cannulate the chosen vein as per protocol for the insertion of cannula. Use Water for injection as a flush to confirm the correct position of the cannula in the vein.	To provide safe venous access and allow the procedure to be performed. Pain on administration suggests extravasation. Water for injection is used as per Medusa to prevent drug precipitation.
7. Dispose of sharps as per Trust protocol.	To prevent needle stick injury.
8. Check pupil dilatation.	Administer an extra dose of Tropicamide 1% (if required) to obtain a good dilation. This gives the best chance to obtain high quality images and ensures that dilation remains sufficient under the bright lights from the camera.
9. Introduce the patient to the photographer and aid their positioning at the camera. The photographer will explain the next part of procedure to the patient	To reassure the patient and ensure maximum comfort and compliance during the procedure.
10. Colour images of the fundus must be taken.	These yield important additional information on the composition of the macular lesion allowing interpretation of the ICG. Haemorrhage, pigment and exudate are easily distinguished from each other on colour images.
11. The qualified nurse is to check the drug with another qualified nurse prior to injection, one of whom should be the registrant who administers the dye. Inject the dye as a stat dose, at a rate of 1ml per second, at the indication of the photographer, whilst observing the cannulation site.	Rapid injection of dye ensures a bolus dose, desirable for good photography. Observation of the cannula site for extravasation. Stop the injection immediately if this occurs.
12. Nurse to remain with the patient throughout the whole procedure.	To monitor any adverse effects from the injection. To provide reassurance for the patient and support for the photographer. To aid with positioning of the patient if

	needed.
13. The patient is accompanied to an appropriate area to wait for 30 minutes post dye injection.	To ensure no late onset allergic reactions occur and the patient is reassured while their vision has recovered from the dazzle of the bright lights.
14. Providing the patient is feeling well, the cannula should be removed by a competent practitioner and pressure applied to the area for 2-3 minutes. The wound is then to be dressed with sterile gauze and taped.	To minimise risk of bacteraemia and prevent a haematoma around the injection site.
15. Advise the patient in regard to the bright light and disturbed vision until their pupil dilation reduces. Also advise the patient of what adverse reactions to look out for, and how to deal with these issues if they arise.	To ensure the patient is educated when leaving the department.
16. Complete all relevant paperwork.	To ensure documentation is legible and in line with Trust policy.

Monitoring Tool

How will monitoring be carried out?

- CLINICAL AUDIT - to be carried out if concerns arise regarding variation in practice or adverse effects.

Who will monitor compliance with the guideline?

- Deviations and untoward incidences to be reported on DATIX by staff concerned. Overview of the DATIX reports will be the responsibility of senior Nurses in the FFA/ICG team.

STANDARDS.	%	CLINICAL EXPECTATIONS.
Patient consented correctly.	100%	
Patient given the ICG information leaflet prior to procedure.	100%	
Procedure request form completed and signed by the Doctor.	100%	
Signed record of administration of ICG, completion of the Trust's PVD form, indicating the vein used and any complications.	100%	
DATIX incident report completed for any complications	100%	

REFERENCES:

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Contribution List

Key individuals involved in developing the document

Name	Designation
Mr S Mirza	Consultant Ophthalmic Surgeon – Medical Retina Specialist
July Linton	Junior Sister, Ophthalmology
Laura Knowles	Ophthalmic Nurse Practitioner

Circulated to the following individuals for comments

Name	Designation
Dr John Gardner	Clinical Governance Lead for Ophthalmology
Mr J S Gandhi	Consultant Ophthalmic Surgeon – Medical Retina Specialist
Mrs J Chhina	Consultant Ophthalmic Surgeon – Medical Retina Specialist
Mrs H Sharma	Consultant Ophthalmic Surgeon – Medical Retina Specialist
Mrs H Hipkiss	Advanced Ophthalmic Nurse Practitioner
Mrs S Hood	Ophthalmic Nurse Practitioner
Ms G Hurdman	Ophthalmic Technician

Circulated to the chair of the following committee's / groups for comments

Name	Committee / group
Alison Smith	Medicines Safety Committee

Supporting Document 1 - Equality Impact Assessment Tool

To be completed by the key document author and attached to key document when submitted to the appropriate committee for consideration and approval.

		Yes/No	Comments
1.	**Does the policy/guidance affect one group less or more favourably than another on the basis of:**		
	• Race	No	
	• Ethnic origins (including gypsies and travellers)	No	
	• Nationality	No	
	• Gender	No	
	• Culture	No	
	• Religion or belief	No	
	• Sexual orientation including lesbian, gay and bisexual people	No	
	• Age	No	
2.	**Is there any evidence that some groups are affected differently?**	No	
3.	**If you have identified potential discrimination, are any exceptions valid, legal and/or justifiable?**	N/A	
4.	**Is the impact of the policy/guidance likely to be negative?**	No	
5.	**If so can the impact be avoided?**	N/A	
6.	**What alternatives are there to achieving the policy/guidance without the impact?**	N/A	
7.	**Can we reduce the impact by taking different action?**	N/A	

If you have identified a potential discriminatory impact of this key document, please refer it to Human Resources, together with any suggestions as to the action required to avoid/reduce this impact.

For advice in respect of answering the above questions, please contact Human Resources.

Supporting Document 2 – Financial Impact Assessment

To be completed by the key document author and attached to key document when submitted to the appropriate committee for consideration and approval.

	Title of document:	Yes/No
1.	Does the implementation of this document require any additional Capital resources	No
2.	Does the implementation of this document require additional revenue	No
3.	Does the implementation of this document require additional manpower	No
4.	Does the implementation of this document release any manpower costs through a change in practice	No
5.	Are there additional staff training costs associated with implementing this document which cannot be delivered through current training programmes or allocated training times for staff	No
	Other comments:	

If the response to any of the above is yes, please complete a business case and which is signed by your Finance Manager and Directorate Manager for consideration by the Accountable Director before progressing to the relevant committee for approval