

Examination Protocols and Authorisation Protocols for Medical CT Radiation Exposures

Neuro Referrals

CHH & HRI

The Ionising Radiation (Medical Exposure) Regulations 2017

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INTRODUCTION

This document is written to ensure that departmental process conforms with the Ionising Radiation (Medical Exposure) Regulations 2017 (IRMER 2017).

PURPOSE

1. Exam Protocols: This document ensures the CT department is compliant with regulation 6(4) of the Ionising Radiation (Medical Exposure) Regulations 2017. Regulation 6(4) requires employers to write exposure protocols associated with medical exposures. It is a legal requirement for all IRMER Practitioners and IRMER Operators to follow these procedures
2. Authorisation Protocol: This document ensures the CT department is compliant with regulation 11(5) of the Ionising Radiation (Medical Exposure) Regulations 2017. If a patient attends the CT department and their request conforms to the criteria set out in this document, the IRMER Operator is entitled to authorise the individual medical exposure detailed in the request.

PROCEDURES

History	Scan Request	Question needing to be answered	Protocol	Delegated to Radiographer Authorisation
Head injury - (see Separate Head Injury referral criteria - Appendix I.)	Head / Brain	? Haemorrhage	Non Contrast Head	Y
Headache - Sudden Onset / Severe: Red Flags for Imaging: Focal Neurological deficit; Pappiloedema; Change of level of consciousness; Memory Impairment; Loss of Consciousness		? SAH	Non Contrast Head followed by review ? Proceed to cerebral angiogram	Y
Headache - Acute severe headache, photophobia, neck stiffness				Y
Headache - Chronic : Recent onset and rapidly increasing frequency and severity of headaches; Waking from Sleep; Associated dizziness, lack of co-ordination, tingling or numbness; Headache precipitated by coughing, sneezing, or straining; Recent headache in patients older than 50.		? SOL	Non Contrast Head followed by review ? Proceed to contrast enhanced	Y
Headache - Headache Clinic Also see separate referral criteria from headache clinic. See Appendix II		? SOL	Non Contrast Head followed by review ? Proceed to contrast enhanced	Y
Sudden unresolving onset of: Dizziness, Confusion, Change in level of consciousness, difficulty in swallowing, Muscle weakness, (face, arm, leg), Eyesight problems, Speech problems.		? Stroke / CVA	Non Contrast Head followed by review ? Proceed to contrast enhanced CT angiogram. see Appendix III	Y

History	Scan Request	Question needing to be answered	Protocol	Delegated to Radiographer Authorisation
Sudden onset of the following Dizziness, Confusion, Change in level of consciousness, difficulty in swallowing, Muscle weakness, (face, arm, leg), Eyesight problems, Speech problems. Now resolving		? TIA	Non Contrast Head followed by review ? Proceed to contrast enhanced	Y
Altered conscious level following neuro surgery	Head / Brain	? Haemorrhage / developing hydrocephalus	Non Contrast Head followed by review ? Proceed to contrast enhanced	Y
To asses Craniotomy site for flap reconstruction		Surgical planning	Non Contrast head with 3D recon	Y
Known primary cancer, with Focal Neurological deficit; Change of level of consciousness; Memory Impairment; Recent onset and rapidly increasing frequency and severity of headaches; Waking from Sleep; Associated dizziness, lack of co-ordination, tingling or numbness;	Head / Brain	? Mets	Non Contrast and Post Contrast head Scan. (NB For Ca Prostate Non Contrast head with additional bone Algorithm only)	Y
Confusion, gradual deteriorating mental state		? Chronic SDH / SOL	Non Contrast Head followed by review ? Proceed to contrast enhanced	Y
Mental impairment. (eg dementia, psychosis)		? SOL	Non Contrast Head followed by review ? Proceed to contrast enhanced	Y

History	Scan Request	Question needing to be answered	Protocol	Delegated to Radiographer Authorisation
Known Brain mets		? Progression	Post Contrast head	Y
SAH	Cerebral Angiogram	? Aneurysm	Cerebral Angio	Y
Orbital Trauma	Orbits	? Bony fractures (Floor of orbit)	Non Contrast low dose bony orbit	Y
Facial Trauma	Facial Bones	? Bony fractures	Non Contrast low dose bony orbit	Y
Sinusitis pre FESS, failed medical treatment.	Sinuses	Bony anatomy	FESS	Y

PROCESS FOR MONITORING COMPLIANCE

Regular audit shall take place to ensure radiographers are authorising according to this protocol. Results shall be presented to CTOG / RPA

REFERENCES

National Institute for Clinical Excellence (2014) *NICE Guideline CG176 Head Injury 2014*. National Institute for Clinical Excellence <https://www.nice.org.uk/guidance/cg176> accessed 18/01/2016

Royal College of Radiologists (2012) *iRefer 7th Ed*. Royal College of Radiologists http://portal.e-lfh.org.uk/myElearning/Index?HierarchyId=0_28429 accessed 18/01/2016

Appendix I

CT Brain Scan: Referral Criteria for CT Following Head Injury

CT Brain scans are performed for patients with head injury following the NICE Guideline CG176 Head Injury 2014.

CT Brain should be performed following the summary of the guidelines as below:

Patients having warfarin treatment

For patients (adults and children) who have sustained a head injury with no other indications for a CT head scan and who are having warfarin treatment, perform a CT head scan within 8 hours of the injury.

Adult patients:

Emergency CT within One Hour of arrival at ED

Head Injury and one (or more) of the following risk factors

- GCS less than 13 on initial assessment in the emergency department.
- GCS less than 15 at 2 hours after the injury on assessment in the emergency department.
- Suspected open or depressed skull fracture.
- Any sign of basal skull fracture (haemotympanum, 'panda' eyes, cerebrospinal fluid leakage from the ear or nose, Battle's sign).
- Post-traumatic seizure.
- Focal neurological deficit.
- More than 1 episode of vomiting.

Urgent CT with Eight Hours of arrival at ED

Head Injury and have experienced some loss of consciousness or amnesia since the injury with one (or more) of the following risk factors

- Age 65 years or older.
- Any history of bleeding or clotting disorders.
- Dangerous mechanism of injury (a pedestrian or cyclist struck by a motor vehicle, an occupant ejected from a motor vehicle or a fall from a height of greater than 1 metre or 5 stairs).
- More than 30 minutes' retrograde amnesia of events immediately before the head injury.

Children

Emergency CT within One Hour of risk factor being identified.

1. Head Injury and one (or more) of the following risk factors

- Suspicion of non-accidental injury
- Post-traumatic seizure but no history of epilepsy.
- On initial emergency department assessment, GCS less than 14, or for children under 1 year GCS (paediatric) less than 15.
- At 2 hours after the injury, GCS less than 15.
- Suspected open or depressed skull fracture or tense fontanelle.
- Any sign of basal skull fracture (haemotympanum, 'panda' eyes, cerebrospinal fluid leakage from the ear or nose, Battle's sign).
- Focal neurological deficit.
- For children under 1 year, presence of bruise, swelling or laceration of more than 5 cm on the head.

2. Head injury and have more than 1 of the following risk factors (and none of those above)

- Loss of consciousness lasting more than 5 minutes (witnessed).
- Abnormal drowsiness.
- Three or more discrete episodes of vomiting.
- Dangerous mechanism of injury (high-speed road traffic accident either as pedestrian, cyclist or vehicle occupant, fall from a height of greater than 3 metres, high-speed injury from a projectile or other object).
- Amnesia (antegrade or retrograde) lasting more than 5 minutes

3. Head injury and have only 1 of the risk factors in 2 and none of those in 1 should be observed for a minimum of 4 hours after the head injury. If during observation any of the risk factors below are identified, perform a CT head scan within 1 hour:

- GCS less than 15.
- Further vomiting.
- A further episode of abnormal drowsiness.

Appendix II

CT Brain Scan: Referral Criteria from Headache clinic.

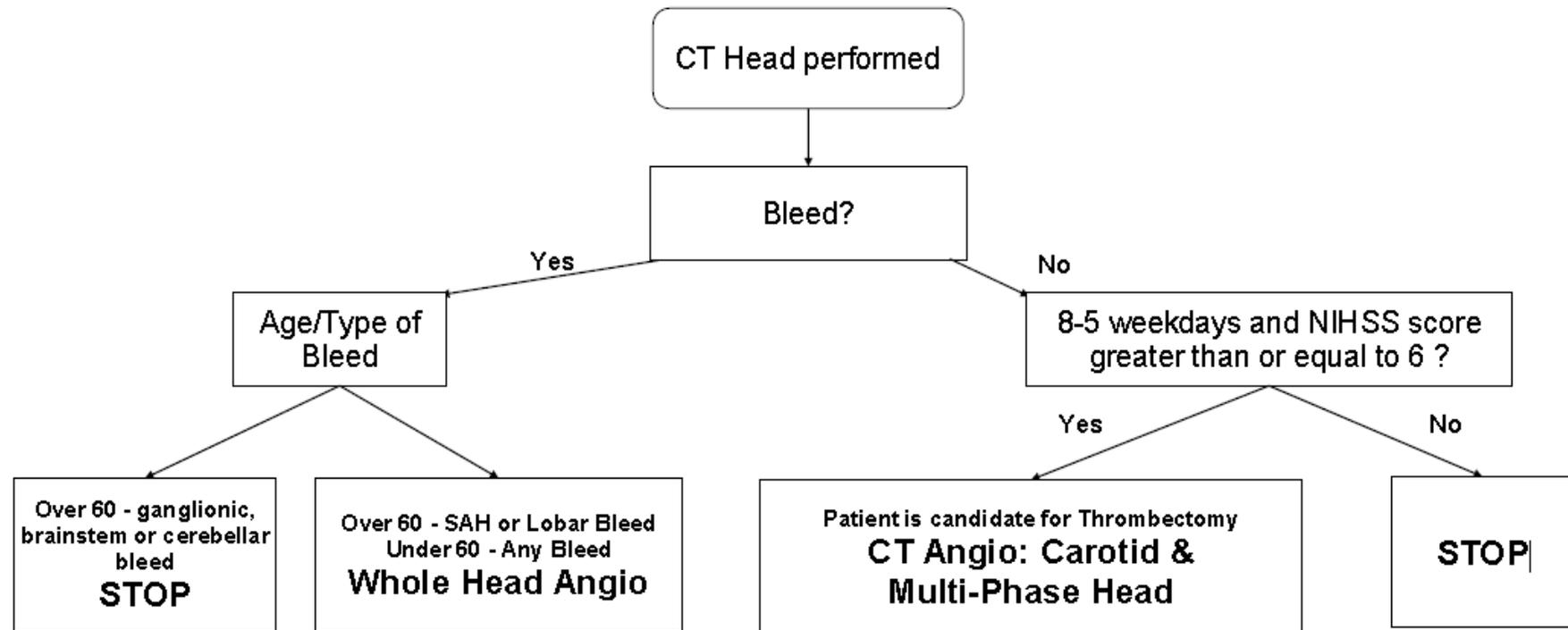
CT Brain scans are performed for patients from the headache clinic with for the following referral criteria:

- a. Cluster headache with atypical features (MRI if pituitary pathology is suspected)
- b. Cluster headaches in females (high chance of finding pathology – Bash guidelines)
- c. New onset of headache above the age of 50
- d. Change in the characteristic of existing migraine
- e. Migraine with prolonged aura
- f. Persisting neurological deficits after migraine
- g. Patients with two or more in the family with aneurysms and or bleed
- h. Recent onset of progressive headache with no previous history
- i. Any neurological signs that seem relevant to the headaches
- j. Unusual headache syndromes such as hemicrania continua, SUNCT, SUNA
- k. Patients with cancer elsewhere with new headache or change in the characteristic of headache
- l. Patients who are immunosuppressed or have HIV and present with new onset or change in characteristic of headache
- m. Reassurance – worry of brain tumour or history of two or more brain tumours in the family (not evidenced based)
 - a) Where the purpose of the referral was to exclude a brain tumour and the clinical consultation has not been satisfactory to convince the patients that there headaches are not due to anything sinister.
 - b) Where the patient is adamant that they would like a scan and a good consultation has failed to convince them that there is no clinical need for it.
 - c) Where the patients were re-referred after a first successful consultation with a continuing headache and had failure to respond to the conventional antidepressants and beta-blockers.

These patients are also informed of the radiation dose and associated risk of cancer & cataract?

Headache centres in the UK refer approximately 30% of their patients for CT. The referral rates for HEYHT are regularly audited to ensure referral rates are similar to this.

STROKE CT HEAD FLOW CHART



ANY IMAGING REQUESTS THAT DO NOT FIT THIS FLOW CHART MUST BE DISCUSSED WITH A NEURO-RADIOLOGIST OR IF OUT OF HOURS THE ON-CALL REGISTRAR