West Midlands Radiotherapy ODN Clinical Guidance

Patient Preparation & Imaging

Revision history

Version	Date	Summary of changes
0.1	December 2021	Initial draft by Linda Farthing
0.2	December 2021	Updated following comments from the protocol implementation group
0.3	January 2022	Updated following comments from the protocol implementation group
0.4	March 2022	Updated following comments from the protocol implementation group
0.5	October 2022	Updated following comments from the protocol implementation group
0.6	December 2022	Updated following comments from the protocol implementation group
0.7	January 2023	Updated by G.Allen following comments from the protocol implementation group
0.8	February 2023	Updated following comments from the protocol implementation group
0.9	February 2023	Updated following regional upper GI protocol change request. Change in document title.
0.9	14th April 2023	Submitted to EAG for ratification
0.9	14th April 2023	Ratified at the EAG
Review Date:	April 2025	

Approved by

This document must be approved by the following people:

Name		Role	Date
	Ratified at the EAG		14th April 2023

Instructions to be given prior to CT and prior to each treatment

PELVIS

Micro enemas /laxatives before CT and each treatment according to local protocols

- Patients are informed prior to CT scan to confirm enema and hydration
- Encourage to drink 2liters in the week before CT, and during gap and every day prior to EBRT
- How do we remind patients of hydration prior to EBRT?

Site	Patient Preparation	Position / immobilisation	Scan details
Prostate	• Empty rectum prior to CT or treatment. • Micro enema and/or Movicol & Semiticone • Empty bladder1 hour prior to CT or treatment • Immediately after emptying bladder drink 300 -500mls of water • Water to be drunk at least 30mins prior to CT or treatment • Full bladder is required for CT and treatment. • Minimum bladder volume: 200mls (Consultants can authorise a lower volume based on clinical condition) • Maximum bladder volume: 400mls	Supine Combi fix or Kneefix & heel stocks	≤ 3mm from top L4 1cm below ischial tuberosities 4cm max rectal diameter IV contrast for involved nodes ? Oral contrast or small bowel
Bladder	• Empty rectum prior to CT or treatment • Consider the use of Micro enema and/or Movicol & Semiticone as preferred • Empty bladder before CT or treatment	Supine Combi fix or Kneefix & heel stocks	Bottom of L1/2 vertebral space 1cm below ischial tuberosities 4cm max rectal diameter IV contrast for involved nodes
Gynae Endo / Cx	• Empty rectum prior to CT or treatment. • Micro enema and/or Movicol & Semiticone as per local policy • Empty bladder1 hour prior to CT or treatment • Immediately after emptying bladder drink 300 -500mls of water • Water to be drunk at least 30mins prior to CT or treatment • Full bladder is required for CT and treatment. • Minimum bladder volume: 200mls (Consultants can authorise a lower volume based on clinical condition) • Maximum bladder volume: 400mls		Scanning levels L1/2 or L3 /L4 4 -5cm below less trochantor For stage 3Cx: Extend CT superiorly to cover para-aortic nodes eg T7/8 – 10 or diaphragm. 2 scans : Full and Empty bladder can provide additional information when adding individualised target volumes (ITV) IV contrast

Anus	• 1 hour prior to CT or treatment empty bladder. • Immediately after emptying bladder drink 300mls of water finishing within 30 minutes • Minimum bladder volume: 200mls (Consultants can authorise a lower volume based on clinical condition) • Maximum bladder volume: 400mls **If oral contrast, instructions to be given at CT.**	Supine Combi fix or Kneefix & heel stocks Bolus: by consultant choice Anal verge and groins 1.0 – 1.5cm of bolus if visible skin infiltration. Must be scanned with bolus in-situ.	Superior aspect of L2/3 4cm below lesser trochanter IV contrast recommended Oral contrast can aid delineation of small bowel loops Radio-opaque marker can be considered for excision scars and distal point of macroscopic disease or anal verge
Colorectal	• 1 hour prior to CT or treatment empty bladder. • Immediately after emptying bladder drink 300 - 500mls of water finishing within 30mins • Minimum bladder volume: 200mls (Consultants can authorise a lower volume based on clinical condition) • Maximum bladder volume: 400mls **If for oral contrast, instructions to be given at CT.** **<u>Bladder filling is dependent on tumour location so it will be specified on booking form. If unsure, check with oncologist.</u>**	1.0 -1.5cm of bolus if visible skin infiltration. Must be scanned with bolus in-situ.	Superior aspect of L2/3 4cm below lesser trochanter IV contrast recommended Oral contrast can aid delineation of small bowel loops Radio-opaque marker can be considered

Instructions to be given prior to CT and prior to each treatment
Breast & Thorax

	Position / immobilisation	Scan levels
BREAST	Majority of patients will be scanned • Supine • Breastboards, inclined 5-12.5' • Mark visible breast tissue and scar • Bolus (0.5 – 1cm thickness) <5mm skin margins. To be scanned with bolus in-situ (unless bolus is covering the whole volume). Alternatives: • Vac bags can be used, particularly when treating IMC or regional nodal volumes • Vac bags with wing board • Orfit thermoplastics might be helpful in Large breasted patients • Some services may consider a prone technique, where equipment exists.	CT of 3mm Breast only to include IMC • Dependant on breast tissue coverage/delineation to include apex of lung and inf end 5cm below inf edge of clinical mark up (head of humerus to be included if required by local protocol). • IV contrast is not required but maybe requested by prescribing clinician (IMC) Breast & Axilla/SCF • dependant on breast tissue coverage/delineation) 2cms superior to the top of the shoulder soft tissue
	DIBH	
	Left sided Tumour Left sided Breast and Supra clavicular nodes IMC volumes for both LT or RT sided tumours Right sided where left was previously treated in DIBH Bilateral treatment	

Site	Patient Preparation	Position / immobilisation	Scan details
Upper GI Oesophagus	Patients should be asked to fast for 2 hours and then drink 200mls of liquid 30 minutes prior to CT planning *and* treatment in an attempt to reproduce the same anatomical position of the stomach due to filling throughout treatment. Variations to this procedure are permitted, particularly for patients with tumours of cervical, upper and middle 1/3 oesophagus where stomach preparation may have negligible benefit, but it is crucial the same stomach preparation procedure is followed before planning and treatment. Patients who have a nasogastric tube inserted and are unable to drink due to dysphagia should use their tube for this purpose. This should be reproduced at treatment delivery	**Cervical & Upper 1/3rd** Supine with arms down by their side with knee support and immobilisation using a head and neck and shoulders shell or equivalent. **Middle 1/3, lower 1/3 and GOJ tumours** supine with arms above head on a wing board with knee support. Immobilisation with thermoplastic device or vacuum cushion as per local protocol. Abdominal compression if available	CT slice thickness of 2.5mm is recommended, but any thickness ≤3mm is adequate. Patients should be scanned in the treatment position. 3DCT should be acquired with patient free-breathing rather (as opposed to breath-hold). Use of 4DCT: *i) For proximal (cervical, upper and middle 1/3 tumours)*: 4DCT planning scans should not be used. *ii) For distal (lower 1/3 and GOJ tumours)*: 4DCT planning scans should be considered (see SCOPE 2 Protocol) Intravenous contrast should be used (providing there is no contraindication) but no oral contrast The Use of Oral Contrast is not recommended, but maybe used for selected patients at the discretion of the prescribing clinician. Alternative - DIBH could be used. The extent of the scan would be from 1cm superior to the apices of the lungs or 6cm superior to the proximal disease, whichever is highest, to the bottom of the L4 vertebra in order to ensure inclusion of all OARs (lungs, liver, kidneys and stomach).
Pancreas	See SCALOP-2 Clinical trial protocol Or Patients will be cannulated and given 150ml of water 15 minutes prior to the scan. Patients will be asked to fast for two hours prior to planning and treatment	Consider wing board or similar	For 50.4Gy in 28# as per SCALOP-2 clinical trial protocol. For 36-45Gy in 15# consider 4DCT planning and motion management as per RCR COVID Pancreatic RT Guidelines Or A contrast-enhanced CT scan will be done with the patient in free breathing, which will be used for planning. If the patient is not suitable for contrast a non-contrasted scan will be done.

			The scan will extend from at least 5cm above the dome of the diaphragm to the bottom of L4, ensuring that the liver, stomach, kidneys, duodenum and small bowel are included in the scan limits. 2.5mm slices will be used.
Lung (non SABR)		Patients will be scanned supine arms up on a wing board. Vacbag can be used if required. Knee support for comfort. For patients that are unable to get their arms up patients can be scanned on a wing board and vacbag with arms by side. The vacbag is to support the shoulders. For lung apical tumours patients can be scanned in a head and neck and shoulders shell with arms down.	4DCT and/or 3DCT Scan depending on local practice with IV contrast if no contraindications, especially if mediastinal disease Slice thickness ≤3 mm To include whole of the lung volume (typically cricoid to L2) using additional 3DCT where necessary. liver to be included as per local protocol if lower 1/3 lung for DVH Refer to local guidelines for superior and inferior scan levels Apical tumours to include incisors
Lung SABR		For lung SABR as above but the vac bag is not optional. For lung apical tumours patients should be scanned in a head and neck and shoulders shell with arms down.	4DCT Scan but usually without IV contrast. Slice thickness ≤3 mm To include whole of the lung volume (typically cricoid to L2). To include liver if lower lung for DVH as per local protocol

Instructions to be given prior to CT and prior to each treatment

IV contrast - and providing adequate renal function (refer to local policy for IV contrast).
Ensure scan is a week after dental extractions or can be on the same day if less than 3-4 teeth have been removed

Site	Patient Preparation	Position / immobilisation	Scan details
H&N	Ensure that any dental work has been carried out. Consider asking patient to trim full beards and untie long hair.	All patients will require a thermoplastic beam directional Shell (BDS) Neck position: All patients will be treated in the supine position with neck neutral, arms at their side and shoulders comfortably resting with immobilisation for knees and feet. Mouthbite:	Patients will undergo CT scanning with slice thickness ≤ 2.5mm. Patients should be considered for IV contrast at the discretion of the clinician to aid target volume delineation and providing adequate renal function (refer to local policy for IV contrast). The use of IV contrast at the time of

	Consider denture placement. Patients should have an MRI scan prior to commencing neoadjuvant chemotherapy to determine pre-chemotherapy target volumes. MRI should be used to aid soft tissue discrimination in pharyngeal cancers particularly in the presence of dental artefacts. MRI fusion should be used to improve target volume delineation particularly for nasopharyngeal cancers and other cancers with gross nerve involvement.	At the discretion of the prescribing clinician a mouthbite may be required and will be specified on the booking sheet. General indications are for: ○ anterior tongue ○ floor of mouth ○ hard palate /maxillary antrum ○ Nasal cavity. The clinician will determine if a mouthbite is needed in these situations depending on patient tolerability and whether reproducibility will be foreseen. A mouthbite is not needed for posterior tongue or oropharyngeal tumours unless there is anterior tongue involvement. Bolus: Bolus will be specified by the clinician on the RT Request and regions which require bolus will be identified by the clinician. These include: palpable primary / nodal disease; skin involvement; anterior commissure involvement for laryngeal cancers. Bolus for the purposes of improving dose coverage should be considered if the CTV is within 3-5mm of the patient's skin surface, according to local protocols. Bolus is not warranted for subclinical nodal regions. Bolus needs to be in-situ in at the time of the CT scan. Gum shields as per local protocol	CT planning does not significantly affect dose calculation in head and neck IMRT plans (Dawson LA et al. Acta Oncol 2008).

Instructions to be given prior to CT and prior to each treatment

IV contrast providing adequate renal function (refer to local policy for IV contrast).

Primary CNS

Site	Patient Preparation	Position / immobilisation	Scan details
Primary CNS	Consider asking patient to trim full beards and untie long hair. Ensure any metal staples are removed prior to scan appointment. Patients could have an MRI scan prior to commencing treatment for fusion for planning if required.	Patient in supine, neutral head position. Position using a thermoplastic shell. Knee and ankle support for comfort if required.	Planning CT scan with slice thickness of minimum $\leq$ 2mm covering the whole skull and upper cervical spine if indicated. Intravenous contrast administered during planning CT scan acquisition may aid target delineation and is recommended for most patients

Instructions to be given prior to CT and prior to each treatment

IV contrast providing adequate renal function (refer to local policy for IV contrast).

Lymphoma

Site	Patient Preparation	Position / immobilisation	Scan details
ALL	See site specific information for patient preparation.	Patients to be planned and treated in the supine position see site specific guidelines. For neck and SCF sites chin extended in a thermoplastic shell. For head sites Clinician to indicate appropriate neck position. In a thermoplastic shell. Mycosis fungoides – clinical mark up.	All patients are 3-D planned using data from a CT planning scan. Maximum 3mm slice thickness taken through the region of interest. IV contrast is recommended to improve localisation of nodal chains. DIBH can be used for thoracic tumours as required. Radical plasmacytoma – technique as per IDRIS protocol guideline 2018.

Instructions to be given prior to CT and prior to each treatment

Palliative	Ensure adequate pain control Anti-emetics prescribed for treatment if treating near the stomach	Supine Prone if unable to lie supine Appropriate immobilisation depending on area to be treated and condition of patient	3D CT 3mm through the area of interest – CT levels will vary

Instructions to be given prior to CT and prior to each treatment

Paediatric cases & Hepatobiliary

Site	Patient Preparation	Position / immobilisation	Scan details
Paediatric	Follow local protocol at UHB		
Hepatobiliary	Follow local protocol at UHB		