HONG KONG COLLEGE OF RADIOLOGISTS

Higher Training (Radiology)

Subspecialty Training in Computed Tomography

[The following guidelines should be read in conjunction with the ***General Guidelines on Higher Training (Radiology)***]

1. INTRODUCTION

1.1 Computed tomography (CT) is a major modality of imaging technique applicable in emergency and elective investigations as well as in imaging guidance for interventional procedures. The introduction of multidetector scanners with dual energy scanning capability in recent years has opened up new fields of clinical application.

1.2 As the trainee has been exposed to CT imaging in Basic Training, during this technique-based higher training in CT, emphasis will be placed on the following:

(a) Appropriate use of CT in patient management
(b) Limitations of CT imaging in general
(c) In-depth knowledge of radiation dose reduction techniques
(d) In-depth knowledge of workflow, scanning protocols and scanning parameters
(e) In-depth knowledge of scanners with latest technology in terms of differences and limitations in technology implementation
(f) In-depth knowledge of latest clinical applications in patient management
(g) Mastery of advanced software applications on post-processing workstations
(h) In-depth knowledge of networking between CT scanners, post-processing workstations and archiving systems
(i) Quality improvement

1.3 Computed tomography is classified by the College as a technique-based subspecialty (Category B).

2. OBJECTIVES

2.1 The trainee should understand the appropriate use of CT in different clinical scenarios with consideration of the ALARA principle as well as other imaging modalities available in the department. Vetting of CT requests is an integral part of training.

2.2 The trainee should be aware of limitations of CT and give advice to referring clinicians regarding the most appropriate imaging modality for the clinical scenario on hand.

2.3 The trainee should have in-depth knowledge of various radiation dose reduction techniques applicable to the scanner, in particular their limitations and possible artefacts if not used appropriately.

2.4 The trainee should be familiarized with workflow in the department, scanning protocols and scanning parameters and give advice on whether changes are required for different clinical scenarios on hand.

2.5 The trainee should have in-depth knowledge of optimal utilization of contrast media used in CT, their precautions, contraindications and associated risks / reactions. The trainee should be competent in the management of the latter.

2.6 The trainee should master basic post-processing techniques including but not limited to MPR, CPR, MIP, MinIP and volume rendering. Trainees should be aware of their clinical use and their limitations.

2.7 The trainee should master advanced post-processing techniques on workstations including but not limited to CT endoscopy, CT subtraction angiography, CT perfusion studies, dual energy applications such as virtual noncontrast and monoenergetic image interpretation, material-specific image interpretation, urinary calculi characterization, differentiation of gout and pseudogout, and metal artefact reduction study in MSK imaging. Trainees should be aware of their clinical use and their limitations.

2.8 The trainee should learn techniques of CT-guided interventional procedures with or without CT fluoroscopic assistance. The trainee should be aware of potential complications and their management.

2.9 The trainee should acquire in-depth knowledge of networking between CT scanners, post-processing workstations and archiving systems in order to promote reliable and efficient image flow in the department.

2.10 The trainee should acquire in-depth knowledge of CT scanners with latest technology from different vendors in terms of differences and limitations in technology implementation.

2.11 The trainee should be familiarized with the process of procurement of CT scanners, site preparation and equipment maintenance (optional).

2.12 The trainee should promote quality improvement and audit activities, and identify facets of CT service that can be improved.

3. TRAINING REQUIREMENTS

3.1 TRAINING CENTRE REQUIREMENTS

The trainee should have access to a modern CT scanner with at least one that is capable of dual energy scanning. The scanner should be able to perform:

(a) Multidetector technique

(b) CT angiography with / without subtraction techniques
(c) CT guided interventional procedures
(d) 3D /4D image reconstruction
(e) Virtual endoscopy
(f) CT perfusion studies
(g) Cardiac CT studies
(h) Dual energy applications
(i) CT fluoroscopy (optional)

A CT scanner in a hybrid operating theatre is optional.

3.2 TRAINER REQUIREMENTS

As specified in the General Guidelines on Higher Training (Radiology).

3.3 DURATION OF TRAINING

Training in the CT subspecialty can be taken in six months (extensive training) or in three months (short training).

3.4 DUTY SESSIONS

3.4.1 Irrespective of the training duration, the training program should comprise appropriate number of CT sessions per week in order to fulfil the minimum numbers of examinations required in Point 3.5. The trainee's duties should include prescribing scanning protocols for patient with different indications, interpretation of imaging findings and preparation of reports.

3.4.2 Participation in CT management of trauma and emergency patients.

3.5 MINIMUM NUMBER OF EXAMINATIONS REQUIRED

3.5.1 Minimal number of cases for a six-month training:

Examination	***RIS Coding****	***Requirement***
Brain	4101, 4102	400
Head & Neck	4103 – 4108 4111 – 4116	50
Chest Abdomen Pelvis	4201, 4202, 4210, 4414 4203, 4204, 4221, 4222 4205, 4206	600
Musculoskeletal	4301 – 4316	15
CT-guided IR procedures	7103, 7108, 7111	10

The above numbers should include studies requiring advanced post-processing including the following (the trainee should manually log case numbers and nature of studies if no specific RIS codes are available):

1. CT angiography of various body regions including the heart: 50
2. CT endoscopy: 10

3. CT perfusion studies: 10
4. Virtual noncontrast, monoenergetic, and material-specific image interpretation: 100
5. Urinary calculi characterization / gout and pseudogout differentiation: 20

3.5.2 For a three-month period rotation, 50% of the above numbers is acceptable.

3.5.3 Code of examinations (as per RIS given at appendix)

3.6 CLINICAL RADIOLOGICAL CONFERENCES AND OTHER MEETINGS

For six-month training, the trainee is expected to chair or present CT case materials in at least six clinico-radiological meetings.

3.7 PRESENTATIONS AND PUBLICATIONS

Please refer to the General Guidelines on Higher Training (Radiology).

3.8 OTHER REQUIREMENTS

3.8.1 The trainee will select, jointly with the trainer, a facet of CT service for quality improvement activity and will deliver a presentation on the results.

3.8.2 The program should also encompass other academic activities, including audit and quality assurance activities, management of and contribution to film museum and teaching files in respect of CT cases.

Last version endorsed by HKAM Council Meeting on 17 November 2011 and effective from 1 July 2012
Revised version endorsed by HKAM Council Meeting on 20 October 2016 and effective from 1 July 2017

APPENDIX

RIS CODING	REGION DESCRIPTION
4101	Brain plain
4102	Brain+con.
4103	Temporal plain
4104	Temporal+con.
4105	Orbit plain
4106	Orbit+con.
4107	Pituitary plain
4108	Pituitary+con.
4109	Dental plain
4110	Dental+con.
4111	Nasopharynx plain
4112	Nasopharynx+con.
4113	Sinuses plain
4114	Sinuses+con.
4115	Neck plain
4116	Neck+con.
4201	Thorax plain
4202	Thorax+con.
4203	Abdomen plain
4204	Abdomen+con.
4205	Pelvis plain
4206	Pelvis+con.
4210	HRCT
4221	Colonoscopy plain
4222	Colonoscopy +con
4301	Upper extremities plain
4302	Upper extremities +con.
4303	Lower extremities Plain
4304	Lower extremities +con.
4305	Cervical spine plain
4306	Cervical spine+con.
4307	Thoracic spine plain
4308	Thoracic spine+con.
4309	Lumbar spine plain
4310	Lumbar spine+con.
4313	Sacrum plain
4314	Sacrum+con.
4315	Sc Joint plain
4316	Sc Joint+con
4401	Infant plain
4403	3D-CT
4404	CT-angioram
4407	Pelvimetry
4408	QCT
4414	CT Virtual Endoscopy-others
7103	CT guided FNAB (w or w/o pathologist)

RIS CODING	REGION DESCRIPTION
7108	CT guided drainage (1 set per catheter or each non-communicating collecting aspirated) exclusive with 7109
7111	Pre-CT guided procedure diagnostic set