BRP302 - Clinical Practice in Radiology Departments

12 credits

Introduction

This practical study-period is organised in connection with the ERASMUS program: “Behavioural and professional aspects of patient care in radiography” (see BRA320), the international exchange program in the Bachelor education in radiography. During this period of eight weeks practice will be organised so that the students have the opportunity to experience one or two of the following modalities; conventional radiography, computed tomography (CT), intervention, magnetic resonance imaging (MRI), nuclear medicine, ultrasound, mammography and/or radiotherapy. The modalities’ special imaging methods and experience of the radiographers’ function will be prioritised. The Bachelor education in radiography has specific learning goals for the individual type of practice described in the "Plan for Practice".

Learning outcomes

On completion of this practice period the student should be able to:

Knowledge
• describe how the professional and behaviour aspects of patient care can be used in different situations
• explain different models of communication with patients and other health personnel
• describe how to behave and use necessary equipment in emergency situations
• describe quality improvement methods
• be knowledgeable about the department’s security processes

Skills
• prepare patients to various examinations
• complete the most common examinations
• use actual equipment in a correct way
• demonstrate technical knowledge
• observe the patient
• collect information about quality improvement tools

General competence
• document one’s product
• be aware of one’s strengths and limitations
• reflect on one’s vocational competence relative to the department’s current guidelines
• observe and assess the department’s normative working routines
• can cooperate with others in the performance of work
• utilise relevant skills and knowledge in unexpected situations
Conventional X-Ray Examinations

Upon completion of the clinical practice period in conventional examinations the student should be able to:

**Knowledge**
- Recognize and describe normal anatomy and pathological structures in the image
- Explain the relevant section’s/department’s daily routines for acute readiness
- Describe the indications for the various types of examinations
- Describe the principles of RIS and PACS and post processing
- Describe the most carried examinations
- Describe exposure techniques/factors for the various examinations
- Explain administrative routines (admission and handling of referrals/pictures)

**Skills**
- Demonstrate skills tied to daily routines at the section/department
- Make the X-ray laboratory ready for the various examinations
- Receive the patient and obtain relevant information from the patient her/himself
- Show an ability to communicate with the patient and relevant others
- Prepare the patient for the different examinations
- Move, secure, stabilize and immobilize the patients for examination
- Show an ability to act in the event of unexpected problems
- Use the actual apparatus correctly
- Use RIS and PACS
- Carry out post processing

**General Competence**
- Complete x-ray examinations independently
- Show wide knowledge about image presentation based on conventional X-ray
- Reflect on your own work in conversation with supervisor, radiographers and contact teachers
- Observe radiation protection principles relative to the patient and personnel
- Follow the current principles for hygiene and security
- Acquire knowledge and skills by being active in learning situations
- Observe the patient’s state of being and carry out eventual interventions before, during and after the examination
- Evaluate anatomical imaging criteria and the technical quality of the X-ray images
- Evaluate your own performance relative to the norms, rules, procedures and routines which are in force in the department

Computer-Tomography – CT

Upon completion of the clinical practice period in CT the student should be able to:

Knowledge
- Describe the preparatory routines for different examination procedures
- Prepare for the relationship between scan-parameters, radiation dose and image quality
- Prepare for the use of oral and intravenous contrast media
- Explain the routines to ensure safe use of contrast media when using the manual injection and automatic injection techniques
- Prepare for the relevant post processing methods
- Explain the specific CT terminologies and radiation doses tied to the chosen procedures
- Explain the use of automatic tube current modulation
- Explain the relationship between choice of scan-parameters and the quality of the post-processing
- Recognize common pathological findings in the images
- Give reasons for the choice of procedures for the examination in question

Skills
- Prepare the patient for CT examination
- Make the laboratory ready for an actual CT examination
- Use available immobilization instruments for moving, positioning and fixing
- Safe-keep the patient’s information needs before, during and after the examination
- Carry out correct centering for the various CT procedures
- Chose the scan area based on the overview/Scout image relative to the problem statement/indication
- Use the automatic contrast media injector
- Recognize artifacts, reasons for and action to minimize these
- Quality assure the use of automatic tube current modulation
- Carry out post processing methods, eg. multiplanar reformation (MPR)
- Use and adjust the technical parameters in the protocol as well as breathing technique
- Obtain and store information about the patient in RIS/PACS

General Competence
- Reflect on the connection between choice of CT protocol and indications
- Evaluate the need for change of scan-parameters relative to the protocol
- Evaluate the value of the use of post-processing methods
- Improvise and be ready to problem solve in the event of unexpected situations
- Reflect on your own role in team work
- Evaluate the image quality and achievement of image criteria
- Reflect on the development and use of protocols for children

Magnetic Resonance – MR
Upon completion of the clinical practice period in MR the student should be able to

Knowledge
- Describe patient preparatory routines for different examination procedures
- Describe safety routines
- Give reasons for the choice of image sequencing and weighting
- Explain the relationship between image sequences/image weighting and image quality/artifacts
- Give reasons for the choice of uptake techniques for actual examinations
- Give reasons for the use of contrast media for selected examinations

Skills
- Prepare the patient for examination
- Complete at least three ordinary examination procedures
- Carry out follow-up work of examinations
- Inform the patient about the examination
- Prepare the equipment and the patient for the contrast media injections
- Utilize current principles for hygiene and safety
- Modify image technique parameters
- Recognize common pathological findings in the images
- Collect and store the images/information in RIS/PACS
- Consider, defend and carry out relevant single picture processing procedures
- Consider image quality

General Competence
- Exchange perspectives for given relevant disciplinary and work ethical challenges in work on MR examinations and diagnostics
• Develop further respect for patients in vulnerable situations relative to the examinations
• Show an ability for collaborative work
• Take responsibility for acquiring the learning benefits in various challenges in the student practice sessions and use professional personnel as a resource for learning

Angiography and Intervention
Upon completion of the clinical practice period in angiography and intervention the student should be able to

Knowledge
• Explain which illnesses are mostly seen/treated in this section
• Explain the optimal use of the equipment
• Explain when to use standard catheter, guide wire, stent and stent-graft placement
• Prepare for intervention in acute situations

Skills
• Explain the examination procedure to the patient
• Provide radiation protection for patient and personnel
• Carry out covering for sterile procedures
• Use power injector for contrast media in a responsible way
• Move secure, stabilize and immobilize the patient in preparation for the examination/treatment
• Assist the radiologist during the most common examinations/treatment methods
• Carry out post processing

General Competence
• Show an ability to collaborate with others
• Care for the patient
• Actively follow current principles for hygiene and safety
• Reflect on one’s own work in conversation with radiographer, physicians and other personnel
• Utilize given criteria for acceptance of examination/treatment
• Reflect on your own performance relative to current professional norms, rules, procedures and routines
• Reflect on your own performance competence

Radiation therapy
Upon completing of the clinical practice section on radiotherapy the student should be able to:
Knowledge
- Explain the most common malignancies which are treated with radiotherapy
- Identify different treatment procedures
- Repeat the different factors which affect dose distribution
- Know the hole radiotherapy process
- Explain the choice of radiation quality
- Explain choice of lying position and its reproducibility
- Explain Image Guided Radiotherapy, IGRT, and different type of images (KV, MV and CBCT)
- Explain side effects and action against these
- Know different volume and margin in radiotherapy
- Explain radiation protection intervention

Skills
- Prepare the treatment room for the patient.
- Evaluate the patient’s need for care during the period of radiotherapy.
- Describe control routines and quality assurance, including treatment documentation.
- Participate in treatment of the patients (IGRT).
- While being supervised make a simple dose plan.
- Participate in the monitor calculations relative to the cross sectional dimension and source-skin distance.
- With your supervisor review all treatment data before the first treatment.
- Be able to read and understand different dose plans and other documentations of radiotherapy.

General Competence
- Overview of the radiotherapy process
- Evaluate your own competence
- Discuss different compensation possibilities with your supervisor
- Show an ability to collaborate across disciplines

Nuclear Medicine
Upon completion of this clinical practice session in nuclear medicine the student should be able to
• Identify actual problem areas which are presented during the section’s nuclear medicine examinations
• Describe how the section’s nuclear medicine examinations are carried out
• Describe the development and function of the section’s imaging equipment including the various collimations and the sections equipment for production of radiopharmaceuticals
• Observe and describe the work routines at the department’s) hotlab
• Explain which tracers are used with radiopharmaceuticals for the various examinations
• Explain the section’s handling of radioactive waste, security processes relative to radiographic protection for the patient, the personnel and general population

Skills
• Inform the patient about the carrying out of the examination
• Prepare and carry out injection of radiopharmaceuticals
• Start, complete and approve the examination
• Get the patient to the work station and chose the correct protocol
• Place the patient on the patient table
• Participate at the administration of radiopharmaceuticals and possible blood sugar measurement (PET/CT)
• Forward the data from the examination to PACS
• Complete the protocol for at least three examinations, such as for example skeletal scintigraphy, renography, thyroid scintigraphy and parathyroedea
• Differentiate between normal and pathological uptake of radiopharmaceuticals
• Assist in other types of examinations

General Competence
• Exchange perspectives about relevant professional challenges in the diagnostic and treatment work of nuclear medicine
• Develop further (your) respect for patients in vulnerable situations related to nuclear medicine examinations
• Take responsibility for constructive collaborative work with personnel at the department of nuclear medicine and other department and other departments which make use of the NM/PET department’s services
• Take responsibility to obtain learning benefits in the given challenges in the student clinical practice program and take advantage of professionals as resources for learning
• Be aware of your own competence

Mammography
Upon completion of the clinical practice session in mammography the student should be able to

**Knowledge**
- Be aware of the caring needs of the various users of the mammography services, especially in terms of information and communication
- Be aware of the use of radiation physics in mammography and the importance of compression
- Describe the control routines and the quality assurance carried out at a mammography center
- Evaluate the radiation protection routines at a mammography center
- Evaluate (your) own images in terms of the given criteria given in the PGMI
- Be aware of additional examinations such as ultra-sound, biopsy etc. and be able to explain why additional examinations are relevant
- Be aware of normal anatomical and pathological processes

**Skills**
- Provide appropriate information for a patient in clinical mammography and screening examination
- Carry out a mammography examination under the supervision of a radiographer
- Place a sterile cover for simple interventions and assist the physician during the examination

**General Competence**
- Exchange perspectives about relevant professional challenges in mammography examinations and diagnostics
- Develop further respect for patients in vulnerable situations relative to mammographic examinations
- Take responsibility for constructive collaborative work with personnel at the mammography center
- Take responsibility for the learning benefit relative to the given challenges in student clinical practice and use professional personnel as resources in learning Exchange perspectives about relevant professional challenges in the diagnostic and treatment work of nuclear medicine
Pedagogical methods
Each student shall have a 30 hour week in practice exclusive of lunch. The practice period is divided into two parts and the student usually complete practice at two different modalities. The student will be supervised by a radiographer. Contact teacher is the representative from the Bachelor education in radiography and is responsible for the student’s completion of the practice periods.

Form of assessment
Mandatory requirements
All practice is mandatory and absence over 10% will lead to a "fail". Learning acquired in the respective practical placement areas is directly related to professional radiography and is therefore difficult to obtain elsewhere.

Term/expression of assessment
Practice is assessed to pass/fail

Examiner arrangement
The practice will be evaluated by the supervisor and the contact teacher. The contact teacher is responsible for ensuring that the assessment is carried out.

Repetition of practice if failed
The actual part has to be repeated

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