

**CATEGORICAL COURSE CURRICULUM
2 YEAR COURSE**

ULTRASOUND

Lecture 1	Normal Gyn Anatomy
Lecture 2	Uterine Abnormalities
Lecture 3	Ovarian Abnormalities
Lecture 4	First Trimester OB- Normal
Lecture 5	First Trimester OB – Abnormalities
Lecture 6	Second/Third Trimester – Normal
Lecture 7	Abnormal Head Fetal Ultrasound
Lecture 8	Abnormal Abdomen Fetal Ultrasound
Lecture 9	Multiple Gestations
Lecture 10	Doppler Ultrasound
Lecture 11	Abdominal Ultrasound
Lecture 12	Renal Ultrasound
Lecture 13	Prostate Ultrasound
Lecture 14	Scrotal Ultrasound
Lecture 15	Carotid Ultrasound
Lecture 16	Neonatal Ultrasound Head
Lectures 17 – 36	Case Conferences/Board Review

Goals and Objectives for the Radiology Resident Rotation in Ultrasound

General overview

Radiology resident rotations in diagnostic ultrasound consist of an introductory (2 week mini-rotation) during the first 4 months of residency and one month blocks thereafter for every year of residency (a total of 18 weeks). The learning of ultrasound is accomplished equally from theoretical knowledge and practical hands-on experience. As such, the requirements are stated as specific goals and objectives required for every level of training with graded supervision both by the staff sonologist and sonographer. These requirements are meant to be minimum

requirements and a resident can conceivably complete the requirements ahead of schedule. Diagnostic ultrasound experience is available in all three hospitals (University Hospital, VA Hospital and Arkansas Children's Hospital). The following responsibilities for both residents and faculty are outlined for the main rotation at the University Hospital:

Resident responsibilities:

1. The resident is involved in the daily conduct of ultrasound services. At the start of every working day, the resident should be familiar with the patient schedule and anticipate needs for any procedures.
2. He/she is expected to be available for consultation by sonographers, clinicians and other health care professionals during regular office hours except during conference times. If the resident is unavailable, the attending staff should be informed so proper coverage is arranged.
3. Every examination should be checked by the resident before the patient leaves the department, whenever possible.
4. Any questions should be referred to the attending staff on ultrasound.
5. If additional views are needed, the resident will instruct the sonographer on what specific views are required. If necessary, the resident will perform the additional views personally.
6. Preliminary reports are written for all emergency room referrals and patients who are going to a clinic appointment on the same day of the examination.
7. Review of cases with the staff will be conducted as many times in the day as necessary to keep an efficient work flow.
8. All examinations should be dictated by the end of every working day.
9. The resident will check his/her reports daily prior to final verification by staff.
10. The resident will select cases to be shown every Tuesday morning conference and make short focused case presentations on a selected case.
11. The resident will submit the specified case requirement appropriate for his/her level of training at the end of the rotation. Under special circumstances, if for some reason this is not accomplished, this will be added on to the next month's rotation requirements.

Staff responsibilities:

1. Staff should be available at all times for any questions or consultations needed by the resident.
2. Staff should review all cases with the resident before the end of the working day.
3. Staff should provide guidance for the resident in the conduct of the Tuesday morning conference.
4. Staff should provide the resident with constructive feedback in any problem areas encountered during the rotation.
5. Staff should verify resident-generated reports in a timely manner and inform the resident of any major changes he/she made.

General Goals and Objectives

Goal

The purpose of ultrasound training in radiology is to enable a resident to confidently diagnose common abnormalities that can be detected by ultrasound once he/she has graduated from the program. In accomplishing this, the resident should be familiar

with all the necessary steps in generating the ultrasound study.

Objectives

Patient care:

1. The resident should have knowledge of indications for the examinations requested. When the reason for the examination is not clear, the resident should effectively communicate with the patient or referring physician until this is clarified.
2. The resident should be familiar with available medical records and how to access them for purposes of patient care.
3. All studies should be reviewed with staff attending.
4. Preliminary reports should be made available to all referring clinicians if needed prior to final review of cases. When there is a significant discrepancy between the preliminary reading and final reading, the resident should notify the referring clinician immediately.

Medical Knowledge:

1. The resident should be familiar with the anatomy of the organs examined in every case. An atlas of cross-sectional anatomy should be consulted when there is any doubt.
2. Depending upon the indication of the examination, the resident should be familiar with ultrasound findings in the disease entity suspected.
3. In cases where the resident is not familiar with the disease entity or expected findings on ultrasound, he/she should recognize that limitation and consult with staff or appropriate reading material.

Practice Based Learning and Improvement:

1. The resident should demonstrate evidence of independent reading and learning through the use of printed and electronic sources.
2. Follow-up of abnormal or interesting studies should be accomplished through personal communication with the referring physician or patient medical records.
3. The resident should be competent in using the ultrasound PACS in the daily accomplishment of the work load and instruct others in its use
4. The resident should use cases in PACS to conduct Tuesday morning conferences.

Interpersonal Communication Skills

1. The resident should be able to communicate effectively results of studies to referring clinicians whenever needed. For emergent studies, this should be done in a timely manner.
2. The resident should be able to effectively convey the findings of examinations through accurate dictation of reports.

Professionalism

1. Residents should be able to explain the nature of the examination or findings in an examination to patients and their families when needed.
2. Residents should observe ethical principles when recommending further work-up for cases.
3. Promptness and availability at work are expected of every resident.
4. Residents should dress appropriately when coming to work.
5. Sonographers and other health workers should be treated with respect and part of the health care team.

6. Patient confidentiality should be observed at all times.

System Based practice

1. Residents should be familiar with departmental procedures necessary in the performance of the examination.
2. Residents should learn appropriate language to be used in communicating to clinicians through reports or consultations so proper management decisions can be made.
3. Proper dictations should be made with indications, technique, findings and conclusions
4. Residents should dictate and correct their reports in a timely fashion to avoid delay in patient disposition.
5. Residents should assist in facilitating examinations whenever possible.
6. Resident should recognize the role that ultrasound plays in the management of patient's illness and make proper recommendations when needed
7. Suggestions to improve methods and systems utilized in radiology should be made whenever appropriate.

First Year Mini-rotation (First Two Weeks)

Goal:

This rotation is designed to acquaint the resident with daily ultrasound service routines from the time the patient arrives in the department to the time the examination is interpreted and dictated. Likewise, the resident is exposed to the breadth of services provided and basic requirements in each ultrasound scanning protocol according to ACR/AIUM guidelines. Basic physics and instrumentation will be the focus of this rotation. This will be learned through reading the chapter on ultrasound physics and daily observation of routine scanning procedures. No objective tests will be given but resident understanding of basic aspects of physics and instrumentation will be assessed during daily case discussions.

Objectives:

By the end of this rotation the resident will demonstrate familiarity with the following:

1. daily work routine.
2. ACR/AIUM guidelines
3. ultrasound scanning protocols
4. equipment used including the variety of available transducers
5. basic ultrasound physics and instrumentation

First year Full Month of Rotation

Goal:

In this rotation, knowledge of abdominal anatomy and pathology will be emphasized. The resident will be involved in the interpretation of all examinations done during regular office hours. However, competence in abdominal sonography is what will be tested at the end of the rotation. A complete abdominal ultrasound independently performed by the resident will be required at the end of the rotation.

Objectives:

By the end of this rotation the resident will accomplish the following:

1. Familiarity with the normal sonographic anatomy of the abdomen including

- Doppler evaluation of the liver
2. Familiarity with common diseases detected by ultrasound in the upper abdomen and know the diagnostic criteria for: cholecystitis (acute and chronic), cholelithiasis, biliary dilation, pancreatitis, hepatic parenchymal disease, renal parenchymal disease, hydronephrosis and splenomegaly
3. Score at least 80 % on the first year written test before the end of the rotation.
4. Submit a complete abdominal scan he/she has independently performed according to ultrasound protocol

Second Year

Goal:

Prior to this rotation, the resident would have passed the basic ultrasound case exams required prior to taking upper level call. This rotation will emphasize knowledge and skills in pelvic ultrasound, both transabdominal and endovaginal. Although the resident will be involved in the interpretation of all cases done during the rotation, objective testing will be concentrated on pelvic ultrasound knowledge including first trimester obstetric ultrasound. The resident will be required to submit one complete case of transabdominal and endovaginal ultrasound that he/she has performed independently by the end of the rotation.

Objectives:

By the end of this rotation the resident will accomplish the following:

1. Familiarity with normal pelvic sonographic anatomy (transabdominal and endovaginal) including Doppler
2. Familiarity with techniques and procedures in performing both transabdominal and endovaginal scanning protocols
3. Know the criteria for diagnosis of the following: normal first trimester pregnancy, ectopic pregnancies, leiomyomata, adenomyosis, adnexal masses (ovarian and non-ovarian)
4. Score at least 80 % on the second year written test before the end of the rotation
5. Submit one transabdominal and one transvaginal scan independently performed by the end of the rotation, according to protocol

Third year

Goal:

During this rotation, the resident will concentrate on developing skills in obstetric sonography. Through exposure and involvement in actual scanning of second and third trimester patients, the resident will learn how to obtain required images that need documentation in a complete obstetric ultrasound. One complete case in the second or third trimester that has been scanned independently by the resident will be required at the end of the rotation.

Objective:

By the end of this rotation the resident will accomplish the following:

1. Familiarity with protocol for comprehensive obstetric ultrasound evaluation
2. Familiarity with criteria for normal second/third trimester pregnancy
3. Familiarity with abnormalities that could be diagnosed in each step of the examination
4. Familiarity with criteria for the following fetal anomalies: neural tube defects,

- cleft lip/palate, major cardiac anomalies, lung masses, esophageal atresia, duodenal atresia, bowel atresias, abdominal wall defects (emphasis on omphalocele and gastroschisis), renal agenesis, renal cystic diseases, obstructive GU abnormalities and urinary bladder abnormalities
5. Score at least 80 % on the third year test before the end of the rotation
 6. Submit a complete obstetric ultrasound study that he/she has independently performed

Fourth year

Goal:

Competence in all areas of ultrasound is expected at this stage of training. The resident should be able to perform any of the basic ultrasound procedures with complete protocol requirements. Any submitted case judged deficient from prior rotations will be repeated at this time. In addition, the resident will be required to submit the following specialty case studies that he/she has independently performed: carotid and neonatal head.

Objectives:

By the end of this rotation the resident will accomplish the following:

1. All prior requirements
2. Resubmit cases that were judged inadequate from prior rotations
3. Familiarity with normal anatomy of the neonatal head and carotids including Doppler criteria
4. Familiarity with criteria for diagnosis of the following: intracranial hemorrhage, common neonatal brain anomalies, carotid artery stenosis
5. Score at least 80% on the fourth year test before the end of the rotation
6. Submit one case each of neonatal head ultrasound and carotid ultrasound he/she has performed independently
7. Be able to teach basic ultrasound to more junior residents and other health personnel

Basis of evaluation:

1. Familiarity with the daily work schedule and anticipation of needs.
2. Availability for consultation with clinicians.
3. Daily one on one case discussion with staff.
4. Quality of Tuesday morning conferences.
5. Sonographers' evaluation of the resident during rotation.
6. Performance in written exam.
7. Quality of cases independently performed by the resident and submitted at the end of the rotation. If the case requirements are not met by the end of the rotation, this will be duly noted on the evaluation of the rotation as a deficiency.

Required reading material:

1. Textbook of Diagnostic Ultrasound – Rumack CM, Wilson SR and Charboneau W (eds). Mosby-Year Book. St Louis, 2004.
2. ACR Ultrasound Learning File 2004

Other references:

1. Ultrasound in Obstetrics and Gynecology – Callen PW (ed). W.B. Saunders, 2002.

2. Ultrasound: The Requisites – Kurtz AB, Middleton WD. Taylor and Francis, Inc. St. Louis, 1996.

Name _____
Date _____

"360°" Evaluation of Radiology Resident Performing Ultrasound

Scale: 1 (unacceptable) 2 (needs improvement) 3 (adequate) 4 (good) 5 (near "perfect")
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1. Introduces self

1 2 3 4 5

2. Demonstrates professional attitude

1 2 3 4 5

3. Gives time for questions and answers appropriately

1 2 3 4 5

4. Obtains appropriate images

1 2 3 4 5

5. Completes examination in a timely manner

1 2 3 4 5

6. Rapport with technical staff

1 2 3 4 5

Comments: _____

Name _____

Date _____

**Checklist
Radiology Resident
Ultrasound**

Needs

Satisfactory Improvement

Reviews appropriate prior studies and/or reports if available

Knows indications for study and questions to be answered

Knows basic controls of ultrasound machine (power, TGC curve, gain)

Knows basic transducer physics

Identifies normal ultrasound landmarks in the abdomen

Reviews exams with staff

Communicates with technologist about F/U or lets patients go ASAP

Obtains additional images when needed

Call results if needed

Dictates report

Writes brief report on record book

Follows up on interesting cases

Demonstrates ability to perform independent US exam appropriate for level of training as required

Comments

: _____

Completed by _____

Date _____

Ultrasound Evaluation

Patient Care

1) Communicate effectively and demonstrate caring and respectful behavior when interacting with patients and families

- 2) Gather essential and accurate information about patients when appropriate (reviews old films, chart, lab work, calls referring MD)
- 3) Use information technology to support patient care decisions and patient education (looks up needed information in books, on-line)
- 4) Work effectively with other health care professionals including other disciplines to provide patient focused care (interpersonal skills, calls reports when needed, affable on call)

Knowledge

- 5) Demonstrate an investigatory and analytic thinking approach to clinical situations (after gathering necessary history and clinical information, tailors studies to answer clinical questions)
- 6) Know and apply basic and clinical sciences - Physics (uses physics and radiation biology in daily practice, ie: proper protocol for studies, proper size thickness, appropriate repeat of studies)
- 7) Know and apply basic and clinical sciences - Is familiar with proper use of various contrast agents
- 8) Know and apply basic and clinical sciences - Appropriate knowledge of common disease processes
- 9) Visual perception
- 10) Ability to formulate a differential diagnosis
- 11) Knows necessary anatomy
- 12) Performs completely all invasive procedures appropriate for level of training (manual skills)

Practice-Based Learning and Improvement

- 13) Locate and assimilate evidence from scientific studies related to patient problems (shows evidence of independent study and choice of journal club articles)
- 14) Appropriate followup of cases
- 15) Facilitates learning of students and other health care professionals (teaches others in the reading room - students, other service residents, techs, nurses, etc.)

Interpersonal and Communication Skills

- 16) Work effectively with others as a member of the imaging team (pitches in where and when needed - not a clock watcher, comes on time, stays late, timely return from conf.)
- 17) Dictate written reports that are correct, concise, meaningful, quality of dictation - timeliness of signing reports

Professionalism

18) Considers well being of patients and department ahead of personal needs (availability)

19) Commitment to ethical principles (pt. Confidentiality, obtaining informed consent, business practices)

20) Maintains appropriate professional demeanor in patient care areas and reading room

Systems-Based Practice

21) Understands how their patient care and image interpretation affects patient care and other professionals (and vice versa) (demonstrates timely reporting, faxing, calls to referring MD's, careful coding)

22) Concern for cost-effective operation of department, patient imaging work-up, effect on hospitalization, etc. (adds on studies late when needed, timely reporting, use of most efficient modality to obtain needed information)

23) Assist patients with complexities of medical system when possible