IMAGING
Indication Guidelines

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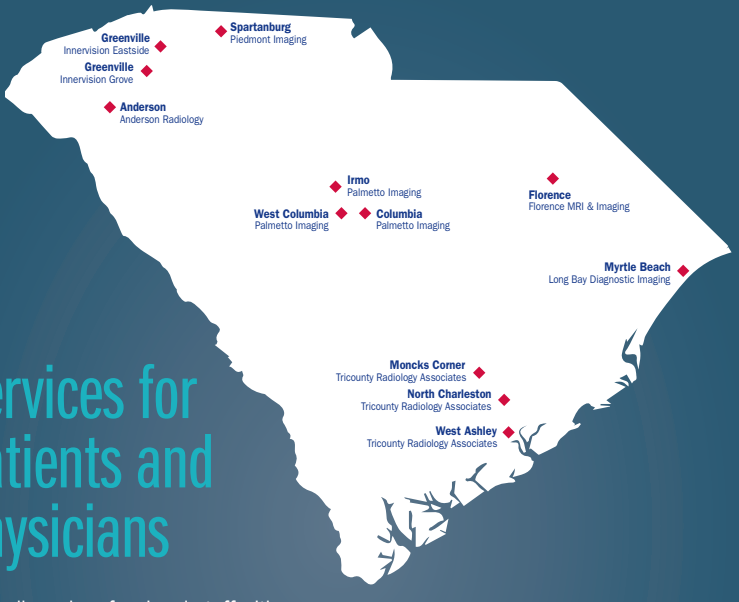

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We are dedicated to achieving the highest levels of quality and safety, and have developed these **Imaging Indication Guidelines** to provide information and guidance during the radiology ordering process.

General Contrast Guidelines

Choose "Radiologist Discretion" on the order, and our board certified radiologists will select the contrast option suited to your patient's history and condition. This will help facilitate the pre-authorization process.

Generally, contrast is indicated whenever you are concerned about:

- Infection (except uncomplicated sinusitis)
- Tumor or cancer
- Vascular abnormality (except stroke)
- Organ integrity
- Possible disc after lumbar surgery

Generally, contrasted MR scans are performed with and without contrast.

Generally, CT scans are performed either with or without contrast in order to limit the patient's radiation dose. Without & with contrast CT scans are indicated for these conditions:

- Salivary gland mass
- Thoracic aortic dissection
- Adrenal gland mass
- Kidney mass
- Painless hematuria
- Follow-up transitional cell carcinoma

Exams Commonly Confused:

• Cervical CT or MR (for cervical spine)	vs.	Soft tissue neck CT or MR (for soft tissue, e.g. lymph nodes)
• Abdomen CT or MR (covers diaphragm to iliac crests)	vs.	Pelvis CT or MR (covers iliac crests to pubic symphysis)
• Transabdominal pelvic ultrasound (US probe on abdomen)	vs.	Transvaginal pelvic ultrasound (US probe in vagina)
• Ankle CT, MR or X-ray (looks at distal tibia, fibula, talus, calcaneus)	vs.	Foot CT, MR or X-ray (looks at tarsals, metatarsals, toes)
• Lower extremity arterial Doppler ultrasound (includes arterial waveforms & Doppler, with or without ABI)	vs.	Ankle Brachial Index-ABI (only ABI)

Abdomen & Pelvis

Clinical Problem	Preferred Study	Contrast	Comments
Dysphagia	Barium esophagram	Oral barium	If retrosternal dysphagia, endoscopy also an excellent diagnostic test
Gastroesophageal reflux	Barium esophagram	Oral barium	Order to evaluate anatomy, not to diagnose reflux
Abdominal pain: increased amylase and lipase	US abdomen		If amylase and lipase equivocal, consider CT abdomen with contrast / If critically ill, consider CT abdomen with contrast
Abdominal pain: non-focal, fever	CT abdomen & pelvis	IV contrast Oral contrast	If pregnant, consider US or non-contrast MR abdomen & pelvis
Abdominal pain: right upper quadrant	US abdomen		If afebrile, normal WBC & only gallstones on US, consider CT abdomen with contrast
Abdominal pain: right lower quadrant	CT abdomen & pelvis	IV contrast Oral contrast: Radiologist decides	If pregnant, consider US or non-contrast MRI abdomen & pelvis
Abdominal pain: left lower quadrant	CT abdomen & pelvis	IV contrast Oral contrast	
Abdominal mass: palpable	CT abdomen or MRI abdomen	CT: IV contrast MR: without & with IV contrast	
Cancer patient	CT abdomen/ pelvis	IV contrast Oral contrast	Consider Chest CT with contrast if lung metastasis common / MRI abdomen & pelvis without and with contrast is alternative to CT abdomen & pelvis / If hereditary renal cancer, consider without & with IV contrast / If bladder cancer, consider CT urography
Blunt trauma: clinically stable	CT abdomen & pelvis	IV contrast	Also consider CT chest with contrast based on mechanism of injury / If thoracic aortic injury suspected, consider CTA chest
Jaundice: painless	CT abdomen	IV contrast	
Jaundice: with pain	US abdomen		If suspect CBD stones, consider CT abdomen with & without contrast / If US equivocal, consider MR abdomen with & without contrast with MRCP
Liver — incidentally discovered mass	MRI abdomen	IV: without & with contrast	If not able to have MRI and not cystic on US, consider CT abdomen without & with IV contrast
Liver — suspect metastases	CT abdomen or MRI abdomen	CT: IV contrast MR: without & with IV contrast	

Abdomen & Pelvis

Clinical Problem	Preferred Study	Contrast	Comments
Adrenal Gland — incidentally discovered mass	CT abdomen	IV: non-contrast may be sufficient No oral contrast	CT: IV contrast may be indicated if not fat density on non-contrast CT / MRI abdomen without & with contrast is alternative to CT
Suspect small bowel obstruction	CT abdomen & pelvis	IV contrast Oral contrast: Radiologist decides	If high-grade obstruction suspected, avoid oral contrast / If intermittent or low-grade obstruction suspected, consider CT or MR enteroclysis (neutral contrast by NG tube) instead
Crohn's disease	CT abdomen & pelvis or CT enterography	IV contrast Oral contrast	Consider MR enterography if nonacute presentation / Enterography uses neutral contrast by mouth (enteroclysis uses neutral contrast by NG tube)
Upper or Lower GI bleeding	Endoscopy is recommended rather than imaging		If endoscopy negative or cannot be performed, consider angiography (CT or catheter) / If endoscopy and angiography negative, consider ^{99m}Tc active bleeding scintigraphy scan
Painful hematuria, r/o kidney stone	CT abdomen & pelvis	No IV contrast No oral contrast	If negative, consider CT abdomen & pelvis with IV contrast / If recurrent stone disease, consider US kidneys with KUB to decrease overall radiation dose to patient
Painless hematuria	CT abdomen & pelvis (CT urography)	IV: without & with contrast No oral contrast	If hematuria due to renal parenchymal disease, consider US of kidneys and bladder
Renal mass	CT abdomen	IV: without & with contrast No oral contrast	Useful for indeterminate renal cysts/lesions on US / MRI abdomen without & with contrast is alternative to CT / If renal insufficiency, US kidney is alternative
Acute pyelonephritis in complicated patient (e.g., diabetes, stones, prior renal surgery, not responding to therapy, immunocompromised)	CT abdomen & pelvis	IV: with or without & with contrast No oral contrast	Imaging not indicated for uncomplicated patient with acute pyelonephritis
Chronic kidney disease	US kidneys/ bladder		
Hypertension — high suspicion of renovascular hypertension	MR Angiogram abdomen or CT Angiogram abdomen	MRA: without & with IV contrast CTA: IV contrast	MRA without contrast somewhat less accurate but appropriate if decreased renal function; US kidney with Doppler complementary exam with MRA / Imaging not indicated for essential hypertension
Acute scrotal pain without trauma	US duplex Doppler scrotum		

Abdomen & Pelvis

Clinical Problem	Preferred Study	Contrast	Comments
Recurrent lower urinary tract infections in women with frequent reinfections, risk factors, no response to conventional therapy	CT abdomen / pelvis	IV: without & with contrast No oral contrast	Imaging not indicated for uncomplicated patient with UTI
Suspected upper or lower extremity deep vein thrombosis	US upper or lower extremity with Doppler		Always considered a STAT & call report exam
Abdominal aortic aneurysm — planning repair and follow-up after repair	CT Angiogram abdomen & pelvis	IV contrast	If screening, consider US abdominal aorta / If thoracic aorta involved, consider adding CTA chest
Vascular claudication — evaluation	MR Angiogram or CT Angiogram lower extremities	MRA: without & with IV contrast CTA: IV contrast	If screening, consider US lower extremities with Doppler
Sudden onset of cold, painful leg	Arteriography lower extremity		Arteriography allows diagnosis and treatment in same procedure / If noninvasive exam desired, consider lower extremity CTA with contrast or MRA without & with contrast
Abnormal vaginal bleeding — initial evaluation	US pelvis transvaginal		Consider adding US pelvis transabdominal–gives wider field of view, evaluates adjacent organs / If transvaginal probe cannot be tolerated, consider US pelvis transabdominal
Possible ectopic pregnancy	US pelvis transabdominal/ transvaginal		Both transabdominal and transvaginal US should be performed if possible
Pelvic pain: woman with suspected gynecological etiology	US pelvic transabdominal/ transvaginal		Both transabdominal and transvaginal US should be performed if possible
Pelvic pain: no suspected gynecological etiology and ß-HCG negative	CT abdomen & pelvis	IV contrast Oral contrast: Radiologist decides	
Clinically suspected adnexal mass — initial evaluation	US pelvis transabdominal/ transvaginal/ Doppler		Transabdominal shows mass in relation to other structures / Transvaginal shows details of mass / Doppler shows vascularity of mass
Pelvic floor dysfunction	MRI pelvis dynamic	Rectal contrast Vaginal contrast: Radiologist decides	Alternatives include X-ray fluoroscopic cystocolpoproctography with IV, oral, vaginal, and rectal contrast, MR defecography with contrast, US pelvis transperineal

Cardiovascular & Chest

Clinical Problem	Preferred Study	Contrast	Comments
Pulmonary embolus	CT Angiography chest	IV contrast	If respiratory distress or chest pain, scan in an acute care setting / If new symptoms, always considered a STAT & call report exam / If pregnant, consider X-ray chest and US lower extremity with Doppler instead
Acute respiratory illness	X-ray chest		Low yield if age < 40 yo, negative exam, and no risk factors / If immunocompromised, consider CT chest if X-ray chest is normal or equivocal, X-ray chest abnormal but nonspecific, or plan lung biopsy
Acute asthma	X-ray chest		Low yield if uncomplicated acute asthma
Acute exacerbation of COPD	X-ray chest		Low yield if uncomplicated COPD
Chronic dyspnea — suspect pulmonary etiology	CT chest high resolution	No IV contrast	X-ray chest may be helpful to determine if pulmonary or cardiac etiology
Dyspnea — suspect cardiac etiology	X-ray chest and/or US echocardiography transthoracic		X-ray chest may be helpful to determine if pulmonary or cardiac etiology / US echocardiography transthoracic evaluates function and wall thickness
Hemoptysis	X-ray chest		If > 40 yo and/or > 30 pack-year history, consider CT Angiogram chest with IV contrast / If massive hemoptysis, consider arteriography bronchial with or without embolization or CT Angiography chest
Cancer patient	CT chest	IV contrast	Consider CT abdomen with contrast if liver metastasis common / X-ray chest appropriate as a baseline
Blunt chest trauma	CT Angiogram chest	IV contrast	If suspect rib fractures, consider X-ray chest / CT chest with contrast is alternative if CTA chest not available / Low yield if low-energy blunt trauma, normal x-ray chest, normal exam and mental status
Occupational lung disease (silica, coal dust, asbestos)	CT chest and X-ray chest	CT: no IV contrast	CT chest and X-ray chest complementary / If suspect mesothelioma after asbestos exposure, consider CT chest with contrast
Possible thoracic outlet syndrome	MR Angiography chest	IV: without & with contrast	X-ray chest screens for boney abnormalities such as a cervical rib

Cardiovascular & Chest

Clinical Problem	Preferred Study	Contrast	Comments
Man with palpable breast mass, nipple discharge, or nipple retraction	Mammography diagnostic		If < 25 yo, consider US breast / If only gynecomastia, imaging exam not indicated
Uncomplicated hypertension			Low yield from diagnostic imaging
Acute chest pain — suspect aortic dissection	CT Angiography chest & abdomen	IV contrast	MR Angiography chest & abdomen without & with contrast is alternative, pending availability
Acute chest pain — low probability of coronary artery disease	X-ray chest		
Chest pain — suspect acute coronary syndrome or high probability of coronary artery disease	SPECT MPI rest and stress or Arteriography coronary		Arteriography coronary is the gold standard, is invasive, and gives opportunity for interventional therapy
Abdominal aortic aneurysm	CT Angiogram abdomen & pelvis	IV contrast	If screening, consider US abdominal aorta / If thoracic aorta involved, add CTA chest / For planning repair and follow-up after repair
Vascular claudication — evaluation	MR Angiogram or CT Angiogram lower extremities	MRA: without & with IV contrast CTA: IV contrast	
Sudden onset of cold, painful leg	Arteriography lower extremity	Arterial contrast	Arteriography allows diagnosis and treatment in same procedure / If noninvasive exam desired, consider lower extremity CTA with contrast or MRA without & with contrast
Suspected upper or lower extremity deep vein thrombosis	US upper or lower extremity with Doppler		Always considered a STAT & call report exam

Head

Clinical Problem	Preferred Study	Contrast	Comments
Headache	MR head	IV: without & with	Low yield if neuro exam normal and no new features / If suspect skull base, orbital, or periorbital abnormality, consider MR orbits without & with contrast
CVA	CT (0-24hrs) MR (> 24hrs)	No IV contrast	If < 3h, CT prior to rtPA thrombolysis / If < 24h, referral to acute care facility preferred / Consider adding vascular evaluation with head and neck CTA with contrast or MRA without & with contrast
TIA	CT head or MR head	No IV contrast	Consider adding vascular evaluation with head & neck CTA with contrast or MRA without & with contrast
Dementia	MR head	No IV contrast	MR better than CT for evaluation of white matter changes, patterns of atrophy
Neurodegenerative disorder (e.g. Parkinson's disease)	MR head	No IV contrast	
Vertigo with or without hearing loss	MR head/IAC	IV: without & with	Order MR head & IAC
Cranial neuropathy	MR	IV: without & with	Specify cranial nerve on order
Multiple sclerosis	MR	IV: without & with	
Seizure	MR	If < 40 yo: No IV contrast If > 40 yo: IV: without & with	
Pituitary abnormality	MR	IV: without & with	Order MR head & pituitary gland
Brain tumor, metastases	MR	IV: without & with	
CNS infection, abscess, meningitis	MR	IV: without & with	
Aneurysm	MR Angiogram or CT Angiogram	MRA: No IV contrast CTA: IV contrast	MRA for screening (no radiation) / CTA for greater detail
Acute bleed: intracranial or subarachnoid	CT	No IV contrast	Consider referral to acute care facility if clinically unstable
Closed head injury, post-traumatic headache	CT	No IV contrast	If < 24h, referral to acute care facility preferred
Venous sinus thrombosis	MR Venogram	No IV contrast	MR Venogram is like an MR Angiogram, except it looks at the veins rather than the arteries

Spine

Clinical Problem	Preferred Study	Contrast	Comments
Neck or mid-back pain	MR cervical	No IV contrast	No contrast needed for post-op C or T spine
Neck chronic pain with or without trauma history	X-ray cervical spine		If neurologic signs or symptoms, also consider MR cervical spine without / If prior C-spine surgery and X-rays show no complication, consider CT cervical spine without contrast / If X-rays show OPLL, consider CT cervical spine without
Low back pain: no surgery	MR lumbar	No IV contrast	Low yield unless low-velocity trauma, osteoporosis, focal &/or progressive deficit, prolonged symptom duration, age > 70 years, &/or surgery or intervention candidate
Low back pain: post lumbar surgery	MR lumbar	IV: without & with contrast	Contrast distinguishes between scar and disc / If post-op C or T spine, no contrast needed / If post-spine fusion, consider non-contrast CT
Back pain: cancer, infection, &/or immunosuppression	MR affected spine	IV: without & with contrast	If low risk of epidural &/or intraspinal disease, non-contrast may be sufficient
Myelopathy: non-traumatic	MR cervical and/ or thoracic	No IV contrast (see Comments)	If progressive symptoms, oncology patient or suspect infection or tumor, consider contrast
Acute spine trauma — no neurologic abnormalities	CT affected spine	No IV contrast	Low yield of C-spine imaging if low-risk by CCR or NEXUS clinical criteria / If < 24h, referral to acute care facility preferred / If injury not explained by bony fracture or suspect ligamentous injury, consider MR affected spine / If suspect arterial injury, consider CT Angiography or MR Angiography / If no unstable injury on prior imaging and continued pain, consider X-ray affected spine
Acute spine trauma — neurologic abnormalities	CT affected spine and MR affected spine	No IV contrast	CT and MR are complementary
Compression fracture suspected	X-ray affected spine		If considering vertebroplasty or kyphoplasty for poorly controlled pain, consider MR affected spine without contrast / If known malignancy with back pain and compression fracture, consider MR spine without contrast to distinguish between osteoporosis versus destructive lesion (if multiple myeloma and no neurologic symptoms, consider X-ray affected spine instead) / MR is low yield if prior compression fractures healed with conservative management

Musculoskeletal

Clinical Problem	Preferred Study	Comments
Bone/extremity pain	X-ray affected area	If X-rays do not explain symptoms, consider MR affected area without contrast
Soft tissue mass	X-ray affected area	If X-rays indeterminate, consider MR affected area without contrast (MR without & with contrast if spontaneous hemorrhage)
Suspect stress fracture	X-ray affected area	If X-ray normal and: - "need-to-know diagnosis", consider MR affected area without contrast or repeat X-ray in 10-14 days (Tc-99^{m} bone scan is a third option if osteoporosis or long-term corticosteroid therapy) - clinical differential includes pathologic fracture, consider MR affected area without contrast for long bone or CT sacrum without contrast for sacrum
Shoulder — acute pain	X-ray shoulder	If X-rays noncontributory and: - persistent pain, consider MR shoulder without contrast - instability, suspect joint body, < 35 yo and suspect labral tear, consider MR arthrography shoulder - suspect re-tear after prior rotator cuff tear, consider MR arthrography shoulder or MR shoulder without contrast - suspect septic arthritis, consider X-ray arthrocentesis shoulder
Elbow chronic pain	X-ray elbow	If X-rays indeterminate and: - suspect joint body or collateral ligament tear, consider MR arthrography elbow or MR elbow without contrast - suspect osteochondral injury, chronic epicondylitis, biceps tendon tear/bursitis, or nerve abnormality, consider MR elbow without contrast - suspect soft tissue mass, consider MR elbow without & with contrast
Wrist, hand, finger, thumb acute trauma	X-ray affected area	If suspect fracture and X-ray normal, consider MR without contrast, CT without contrast, or cast and repeating X-ray in 10-14 days / If suspect injury to ligament or tendon, e.g. gamekeeper's thumb, consider MR without contrast
Wrist chronic pain	X-ray wrist	If X-rays indeterminate and: - suspect tear of ligament or triangular fibrocartilage, consider MR Arthrography - persistent symptoms or suspect Kienböck's disease, consider MR wrist without contrast - suspect mass or ganglion cyst or inflammatory arthritis, consider MR wrist without & with contrast - suspect infection, consider aspiration of wrist
Hip — acute pain, suspect fracture	X-ray hip and AP pelvis	If suspect fracture and X-ray normal or indeterminate, consider MR pelvis and affected hip without contrast
Hip chronic pain	X-ray hip and AP pelvis	If X-rays indeterminate and: - suspect bone or soft tissue abnormality, consider MR hip without contrast (for osteoid osteoma, consider CT hip without contrast) - suspect osteonecrosis, consider MR hip without & with contrast - suspect labral tear or joint body, consider MR arthrography hip

Musculoskeletal

Clinical Problem	Preferred Study	Comments
Knee acute trauma	X-ray knee	Low yield if fall or twisting injury, no effusion, no focal tenderness, and able to walk / If suspect internal derangement and no fracture on X-ray, consider MR knee without contrast
Knee chronic pain	X-ray knee	If X-ray normal or shows joint effusion, consider MR knee without contrast / If suspect joint body, osteochondritis dessicans, or post-op recurrent meniscal tear, consider MR Arthrography knee / Low yield for further imaging if X-ray shows degenerative, inflammatory, or crystalline joint disease
Knee after total knee arthroplasty	X-ray knee	If pain, no loosening on X-ray, low probability of infection, consider CT knee without contrast / If suspect infection, consider aspiration of knee by specialist
Ankle acute trauma	X-ray ankle	Low yield if able to walk, no bony point tenderness, and neuro intact (no peripheral neuropathy) / If persistent pain and no X-rays at time of injury, consider X-ray ankle / If > 1 week persistent pain and X-rays negative, consider MR ankle without contrast
Ankle chronic pain	X-ray ankle	If X-rays normal and: - suspect osteochondral injury, tendon abnormality, ankle instability or pain of uncertain etiology, consider MR ankle without contrast - suspect osteochondritis dessicans or ankle impingement syndrome, consider MR arthrography ankle - suspect inflammatory arthritis, consider MR ankle without & with contrast
Foot acute trauma	X-ray foot	Low yield if able to walk, no bony point tenderness, and neuro intact (no peripheral neuropathy) / If Lisfranc injury suspected, consider weight-bearing X-ray foot (if not able to bear weight, consider CT foot without contrast or MR foot without contrast) / If suspect tendon rupture or dislocation and X-rays negative, consider MR foot without contrast / If suspect foreign body and X-rays negative, consider US foot
Foot chronic pain	X-ray foot	If X-rays indeterminate and: - pain, burning, and/or paresthesias on plantar surface, athlete with pain over tarsal navicular, or suspect tendinopathy, consider MR foot without contrast - rigid flat foot, consider CT foot or MR foot - suspect complex regional pain syndrome type I, consider Tc-99^{m} 3-phase bone scan foot - suspect Morton neuroma, inflammatory arthritis, consider MR foot without & with contrast If accessory ossicle and pain over tarsus, consider MR foot without contrast
Foot — suspected osteomyelitis with diabetes mellitus	X-ray foot and MR foot without & with contrast or without contrast	X-ray and MR are complementary / MR without & with is useful for identifying complications (e.g., complex fluid collections, abscesses, nonvascularized tissue)

Women's Imaging

Clinical Problem	Preferred Study	Contrast	Comments
Palpable breast mass — initial evaluation	Mammography diagnostic		If < 30 yo, US breast instead of mammography / If 30-39 yo, either US breast or mammography diagnostic
Breast pain without palpable mass	No exam indicated other than following routine breast cancer screening		If < 30 yo and patient wants exam for reassurance, consider US / If 30-39 yo and patient wants exam for reassurance, consider mammography screening
Galactorrhea — hyperprolactinemia of unknown origin	MR head/pituitary	IV: without & with contrast	Order MR head & pituitary gland
Galactorrhea — discharge from single duct, bloody, serosanguineous, or associated with breast mass	Mammography screening and/or galactogram		
Abnormal vaginal bleeding — initial evaluation	US pelvis transvaginal		Consider adding US pelvis transabdominal–gives wider field of view, evaluates adjacent organs / If transvaginal probe cannot be tolerated, consider US pelvis transabdominal
Possible ectopic pregnancy	US pelvis transabdominal/ transvaginal		Both transabdominal and transvaginal US should be performed if possible
Pelvic pain: woman with suspected gynecological etiology	US pelvis transabdominal/ transvaginal		Both transabdominal and transvaginal US should be performed if possible
Pelvic pain: woman with no gynecological etiology suspected and ß-HCG negative	CT abdomen & pelvis	IV contrast Oral contrast: Radiologist decides	
Clinically suspected adnexal mass — initial evaluation	US pelvis transabdominal/ transvaginal/ Doppler		Transabdominal shows mass in relation to other structures / Transvaginal shows details of mass / Doppler shows vascularity of mass
Pelvic floor dysfunction	MRI pelvis dynamic	Rectal contrast Vaginal contrast: Radiologist decides	Alternatives include X-ray fluoroscopic cystocolpoproctography with IV, oral, vaginal, and rectal contrast, MR defecography with contrast, US pelvis transperineal

Screening

Screening	Preferred Study	Timing and Indications for Screening	Comments
Breast cancer screening	Mammography screening	Every year, starting at: - Low risk: age ≥ 40 yo - BRCA carrier/relative: age 25-30 yo - 1° relative with premenopausal breast cancer: later of age 25-30 yo or 10 years < relative's age at diagnosis - Mantle radiation age 10-30 yo: 8 y after radiation but ≥ 25 yo - Proven lobular neoplasia, atypical ductal hyperplasia (ADH), ductal carcinoma in situ (DCIS): any age	If high risk, consider adding 3D tomosynthesis with mammogram or MRI breast without & with contrast
Lung cancer screening	CT chest screening	Every year for patients: - Age 55-74 yo - Without lung cancer symptoms - ≥ 30 pack-year smoking history - Current smoker or stopped within past 15 years - Counselled on smoking cessation	CT done with very low radiation dose
Coronary artery disease screening	CT coronary artery calcium scoring or US carotid intima medial thickness	Asymptomatic with intermediate risk (10%-20% 10-year risk) for coronary artery disease	Useful for reclassifying intermediate risk patients to low or high risk / If low risk patient with family history of premature coronary artery disease, may be helpful
Peripheral vascular disease screening	US lower extremities with Doppler with ankle-brachial index	> 50 yo with history of diabetes or smoking	
Colon cancer screening	CT colonography	Every 5 years after negative screen, starting at age ≥ 50 yo	Recommend if incomplete colonoscopy or refusal of optical colonoscopy / If high risk for colon cancer, recommend optical colonoscopy / Need colon prep

Screening

Screening	Preferred Study	Timing and Indications for Screening	Comments
Osteoporosis screening	DXA PA spine and DXA proximal femur/femoral neck/total hip	Every 2 years until bone mineral density stabilizes unless risk factors* or treatment changes - Post menopausal women > 50 yo - Women in menopausal transition (late 40's) - Premenopausal women with risk factors* - Men with risk factors* *Risk factors include: - corticosteroid treatment - eating disorders - genetic disorders - premenopausal amenorrhea	Prefer DXA of two sites for evaluation / Fracture risk based on T- and Z-score / Follow bone mineral density (BMD), not the T- or Z-score / No fracture risk data for premenopausal women or men 20-50 yo with risk factors / If DXA PA spine not possible due to spine degenerative disease, consider using other hip or forearm for second site / DXA forearm primarily for hyperparathyroidism, weight over table limit
Ovarian cancer screening	None		No screening recommended for average-risk / No proven benefit to screening with CA-125 and/or US for high-risk

IV Contrast

We Screen For:

Decreased Renal Function

- If eGFR below 45 mL/min/1.73 m^2, the radiologist may give less or no contrast

Allergies

- Mild allergies (e.g., rash, hives, swelling of eyes &/or face)
  - Recommend steroid premedication
- Moderate or severe allergies (e.g., inability to breathe, becoming unconscious)
  - Recommend giving IV contrast in an acute care setting after steroid premedication
- Arthrograms and myelograms usually not affected

Asthma

- If poorly controlled, recommend giving contrast in an acute care setting
- Arthrograms and myelograms usually not affected

Pregnancy

- IV contrast can cross the placenta
- Its effects on the human embryo or fetus are incompletely understood
- Recommend no contrast unless:
  1) information cannot be acquired without contrast,
  2) the information would affect the care of the patient and fetus during the pregnancy, or
  3) it is not prudent to wait to obtain this information until the patient is no longer pregnant

Breastfeeding and MRI/CT/X-ray Contrast

- Safe to continue breast-feeding after receiving contrast according to available data
- If concerned, stop breast-feeding for 24 hours with active expression and discarding of breast milk from both breasts during that period

Metformin and CT/X-ray Contrast

- If eGFR below 45 mL/min/1.73 m^2 and current heart failure, heart attack, severe liver disease, severe infection, muscle compartment syndrome, &/or alcohol abuse
  - Stop metformin for 48 hours after contrast
  - Recommend renal function test after 48 hours before resuming metformin

Thyroid Abnormalities and CT or X-ray Contrast

- If a radioactive iodine thyroid scan or radioactive iodine uptake is planned, do before the patient has iodinated CT or X-ray contrast

MR Safety

We screen for implants and any metal in or on patients before they go in the MR scanner.

Radiation Safety

We strive to limit radiation exposure while producing quality CT and X-ray examinations.

Suggested Contrast Premedication Protocols

Protocol 1

- #16 of Methylprednisolone (Medrol) 4mg
  Label: Take eight (8) by mouth 12 hours and 2 hours before the exam is scheduled.
- And consider adding #2 of Diphenhydramine (Benadryl) 25mg
  Label: Take one or two (1 or 2) by mouth 1 hour before the exam is scheduled.
  Do not drive or operate heavy machinery for 4-6 hours after taking.

OR

Protocol 2

- #3 of Prednisone 50mg
  Label: Take one (1) by mouth 13 hours, 7 hours and 1 hour before the exam is scheduled.
- And #2 of Diphenhydramine (Benadryl) 25mg
  Label: Take one or two (1 or 2) by mouth 1 hour before the exam is scheduled.
  Do not drive or operate heavy machinery for 4-6 hours after taking.

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